LAHIRI'S

INDIAN EPHEMERIS

OF

PLANETS' POSITIONS

ACCORDING TO THE *'NIRAYANA'* or SIDEREAL SYSTEM

FOR 1999 A. D.

ASTRO-RESEARCH BUREAU
CALCUTTA

FESTIVALS AND ANNIVERSARIES IN 1999

Festival	Month	Date	Day
Eng. New Year's Day	Jan.	1	Fri.
Birthday of Swami Vivekananda	Jan	8	Fri.
Lohri (Punjab, J. & K.)	Jan.	13	Wed.
Bhogi (S. India)	Jan.	14	Thu.
Makara Sankranti	Jan.	14	Thu.
Pongal (S India)	Jan.	14	Thu.
Magh Bihu (Assam)	Jan.	14	Thu.
Tai Pongal	Jan.	15	Fri.
Mattu Pongal (Kanuvu)	Jan.	15	Fri.
Makara Vavu (Kerala)	Jan.	17	Sun.
Sri Panchami, Vasanta Panchami	Jan.	22	Fri.
Netaji's Birthday	Jan.	23	Sat.
Republic Day	**Jan.**	**26**	**Tue.**
Birthday of Lala Lajpat Rai	Jan.	28	Thu.
Martyr's Day (Mahatma Gandhi Commemoration day)	Jan.	30	Sat.
Guru Rabi Das's Birthday	Jan	31	Sun.
Floating Festival (Tai Poosam)	Jan.	31	Sun.
Janaki (Sita) Janma	Feb	8	Mon
Maharishi Dayananda Saraswati Jayanti	Feb.	9	Tue.
Sivaratri	**Feb.**	**24**	**Sun.**
Birthday of Shri Ramakrishna	Feb.	18	Thu.
Holikadahana	Mar.	1	Mon.
Holi, Dolayatra	**Mar.**	**2**	**Tue.**
Hola, Vasantotsava	Mar	3	Wed.
Chaitra Sukladi, Cheti Chand	Mar.	18	Thu.
Gudi Padava, Ugadi	Mar.	18	Thu
Telugu New Year's Day	Mar.	18	Thu.
Sarhul (Bihar)	Mar.	20	Sat.
Gangaur (Gauri Tritiya)	Mar.	20	Sat.
Indian New Year's Day (SAKA ERA 1921)	Mar	22	Mon.
Vasanti Durga Puja	Mar.	23	Tue.
Annapurna Puja	Mar.	24	Wed.
Rama Navami	Mar.	25	Thu.
Mahavira Jayanti (Jain)	**Mar.**	**29**	**Mon.**
Hanumat Jayanti (S. India)	Mar.	31	Wed.
Vaisakhi (Punjab & Orissa)	Apr.	14	Wed.
Cheiraoba (Manipur)	Apr.	14	Wed.
Mesadi, Tamil New Year's Day	Apr.	14	Wed.
Dr. B. R. Ambedkar Jayanti	**Apr.**	**14**	**Wed.**
Bengali New Year's Day	Apr.	15	Thu.
Bohag Bihu (Assam)	Apr.	15	Thu.
Vishu (Kerala)	Apr.	15	Thu.
Tithi of Sri Deva Damodar (Assam)	Apr.	16	Fri.
Sivaji Jayanti	Apr.	17	Sat.
Akshaya Tritiya	Apr.	18	Sun.
Shri Sankaracharya Jayanti	Apr.	20	Tue.
Sita (Janaki) Navami	Apr.	24	Sat.
Trichur Pooram (Kerala)	Apr.	25	Sun.
Minakshi Kalyanam	Apr.	27	Tue.
Buddha Purnima	**Apr.**	**30**	**Fri.**
May Day	May	1	Sat.
Babu Kuer Singh Day (Bihar)	Apr.	23	Fri.
Birthday of Rabindranath	May	9	Sun.
Ganga Dasahara (except Bengal & Orissa)	May	24	Mon
Pratap Jayanti (Rajasthan)	June	16	Wed.
Guru Arjan Dev's Martyrdom Day	June	17	Thu.
Rajas Samkranti (Orissa)	June	15	Tue.
Jamatri Sasthi (Jamai Sasthi)	June	19	Sat.
Ganga Dasahara (Bengal & Orissa)	June	23	Wed.
Guru Hargovind's Birthday	June	29	Tue.
Birthday of Poet Bhanu Bhakt	July	13	Tue.
Rathayatra	July	14	Wed.
Manasa Puja begins (Bengal)	July	17	Sat.
Kharchi Puja (Tripura)	July	20	Tue.
Guru Purnima, Vyas Puja	July	28	Wed.
Tilak Commemoration Day	Aug.	1	Sun.
Naga Panchami (Bengal)	Aug	2	Mon.
Ker Puja (Tripura)	Aug	3	Tue
Teej (Madhusrava Tritiya)	Aug.	14	Sat.
Independence Day	**Aug.**	**15**	**Sun.**
Naga Panchami	Aug.	16	Mon.
Simhadi (Kerala New Year's Day)	Aug.	17	Tue.
Goswami Tulsi Jayanti	Aug.	18	Wed.
Jhulana Yatrarambha	Aug.	22	Sun.
Onam (Thiru Onam Day)	Aug.	25	Wed.
Rk. Upakarma	Aug.	25	Wed.
Avani Avittam (S. India)	Aug.	26	Thu.
Raksha Bandhan	Aug.	26	Thu.
Sri Narayana Gura Dev's Birthday	Aug.	27	Fri.
Tithi of Sri Madhav Deva (Assam)	Aug.	31	Tue.
Janmastami (Smarta)	Sept.	2	Thu.
Janmastami (Viashnava)	Sept.	3	Fri.
Gokulastami (Nandotsava)	Sept.	3	Fri.
Paryusana Parvarambha (Jain)	Sept.	6	Mon.
Jain Festival	Sept.	9	Thu.
Tithi of Sri Sankara Deva (Assam)	Sept.	11	Sat.
Ganesh Chaturthi	Sept.	13	Mon.
Manasa Puja ends (Bengal)	Sept.	17	Fri.
Visvakarma Puja	Sept.	17	Fri.
Karma (Bihar)	Sept.	21	Tue.
Samadhi Day of Sri Narayana Guru	Sept.	21	Tue.
Ananta Chaturdasi	Sept.	24	Fri
Jitia (Bihar)	Oct.	2	Sat.
Mahatma Gandhi's Birthday	Oct.	2	Sat.
Mahalaya Amavasya	Oct.	9	Sat.
Oli Begins (Jain)	Oct.	16	Sat.
Durga Puja (Mahasaptami)	Oct.	16	Sat.
Durga Puja (Mahastami)	Oct.	18	Mon.
Durga Puja (Mahanavami)	Oct	19	Tue.
Ayudha puja	Oct.	19	Tue.
Dussehra, Ramlila	**Oct.**	**19**	**Tue.**
Vijaya Dasami (Bengal & Kerala)	Oct.	20	Wed.
Janmotsava of Shri Sankara Deva	Oct.	20	Tue.
Bharat Milap	Oct.	21	Thu.
Kojagari Lakshmi Puja (Bengal)	Oct.	24	Sun.
Maharisi Valmiki's Birthday	Oct.	24	Sun.
Kali Puja	Nov.	7	Sun.
Dipavali (Diwali)	Nov.	7	Sun.
Mahavira Nirvan (Jain)	Nov.	7	Sun.
Govardhan Puja, Annakuta	Nov.	8	Mon
Hanumat Jayanti	Nov	8	Mon.
Dwat Puja(Bihar)	Nov.	9	Tue.
Bhratri Dvitiya (Bengal), Bhai Duj	Nov.	10	Wed.
Chhat (Bihar), Surya Sasthi	Nov.	14	Sun
Children's Day (Nehru's Birthday)	Nov.	14	Sun
Kol Yatra (Bihar)	Nov	15	Mon
Kartika Puja	Nov.	16	Tue
Jagaddhatri Puja	Nov.	17	Wed.
Death anniversary of Lala Lajpat Rai	Nov.	17	Wed.
Rasayatra (Smarta)	Nov.	22	Mon.
Rashayatra (Vaishnava)	Nov.	23	Tue
Rathayatra (Parsvanath-Jain)	Nov.	23	Tue
Guru Nanak's Birthday	Nov.	23	Tue.
Puskar Fair	Nov.	23	Tue.
Guru Teg Bahadur Martyrdom Day	Dec.	13	Mon.
Vivah Panchami (Bihar)	Dec.	13	Mon.
Dattatreya Jayanti	Dec.	22	Wed.
Jor Mela (3-days -Punjab)	Dec.	26	Sun.

LAHIRI'S
INDIAN EPHEMERIS
OF
PLANETS' POSITIONS
ACCORDING TO THE *'NIRAYANA'* OR SIDEREAL SYSTEM
FOR 1999 A.D.

Saka era 1920-1921, Bengali Era 1405-1406, Samvat 2055-56

Indian Standard Time or the time for the Central Meridian of India ($5h\ 30m$ or $82\frac{1}{2}$°E. Long.) observed throughout except where otherwise stated. This time may be converted into G. M. T. by subtraction of $5h\ 30m$

(Estimated value of Δ T in 1999 is + $65s$)
(0^h E.T. = $5h\ 29m$ I.S.T.)

(Sixtyfirst Issue)

FOUNDED BY
NIRMAL CHANDRA LAHIRI, M. A.
Ganitacarya, Ganitakalanidhi
Former Member, International Astronomical Union (Paris).
Former Secretary, Calendar Reform Committee (Govt. of India)
Former Officer-in-Charge, Nautical Almanac Unit (Govt. of India)
Former Member, State Almanac Committee (Govt. of West Bengal)

PREPARED BY
ASTRO-RESEARCH BUREAU
under the supervision of A. K. Lahiri
Formerly Scientific Officer of Positional Astronomy Centre,
India Met. Dept. (Govt. of India)

PUBLISHED BY
M. K. Lahiri
ASTRO-RESEARCH BUREAU
17, Brindaban Mullick 1st Lane
Calcutta — 700 009
(Phone : 350-1999)

Price : Rs. 50.00
$ 4 or £ 2.00

PREFACE

This annual astronomical ephemeris has stepped into 61st year of its publication with the present issue for 1999. The Ephemeris was founded by late N. C. Lahiri in 1939, the first Indian member of the Ephemerides-Commission of the International Astronomical Union and the first Officer-in-charge of the then Nautical Almanac Unit of the Govt. of India (now known as Positional Astronomy Centre). This ephemeris is intended to provide in advance most accurate and up-to-date astronomical data to its users.

The ephemeris is based on *nirayana* or sidereal system of calculation. The basis of the nirayana zodiac is the adoption of 285 A. D. or 207 Saka as the zero *ayanamsa* year. This value was adopted by Shri N. C. Lahiri in this Ephemeris from 1948 issue. The Calendar Reform Committee appointed by the Govt. of India in 1952 recommended adoption of this value of *ayanamsa* and later the Govt. of India also adopted this system of *ayanamsa* in 1953. In view of this, it is called as *Lahiri-Ayanamsa.* This value of *ayanamsa* is now being used in almost all the reformed panchangs and ephemeris in India as well as in the *Indian Astronomical Ephemeris* and the *Rashtriya Panchangs* of the Govt. of India. It is worth mentioning that the date of coincidence of the *Sayana* and *Nirayana* zodiacs as was determined by late N. C. Lahiri is almost the same as derived from the data available from the Astronomisches Rechen Institut of Heidelberg, Germany, the well known International Astronomical Institute, being the authority in regard to the position of stars.

In this issue some minor changes in arrangement and presentation have been made. Among these, mention may be made of the inclusion of R. A. and Decl. of Uranus and Neptune along with other planets. Besides these, a short explanatory note on the basis of the *Nirayana* zodiac as adopted in this Ephemeris has been included. Some more items of information in the Glossary has been added. It is hoped that inclusion of these additional items will serve a useful purpose.

We express our thanks to the Director, Positional Astronomy Centre, New Alipore, Calcutta of India Meteorological Department (Govt. of India) for kindly supplying some astronomical data for use in the Ephemeris. We also express our thanks to our esteemed readers and users for their kind co-operation and suggestions. Suggestions for further improvement of this ephemeris, would be highly welcomed. Utmost care is always taken to bring out this publication free of any error.

17, Brindaban Mullick 1st Lane,
Calcutta - 700 009
August 15, 1998
1531398

A. K. Lahiri
Astro-Research Bureau

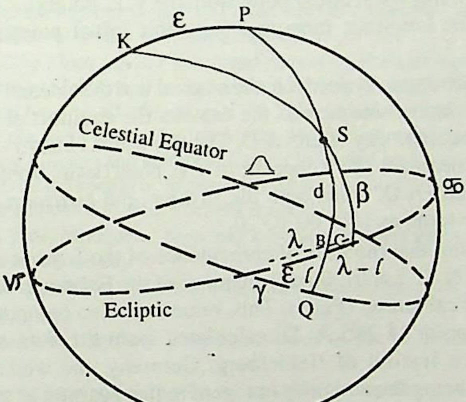
☉	—	Sun	Ravi, Surya
☽	—	Moon	Candra
☿	—	Mercury	Budha
♀	—	Venus	Sukra, Bhrigu
♂	—	Mars	Mangala, Kuja
♃	—	Jupiter	Brihaspati, Guru
♄	—	Saturn	Sani
♅	—	Uranus or Herschel	Indra, Prajapati
♆	—	Neptune	Varuna
♇	—	Pluto	Rudra, Yama
☊	—	Ascending Node or Dragon's head	Rahu
☋	—	Descending Node or Dragon's tail	Ketu
⊕	—	Earth	Prithivi

♈	—	Aries	0	Mesa
♉	—	Taurus	1	Vrisa
♊	—	Gemini	2	Mithuna
♋	—	Cancer	3	Karkata
♌	—	Leo	4	Simha
♍	—	Virgo	5	Kanya
♎	—	Libra	6	Tula
♏	—	Scorpio	7	Vriscika
♐	—	Sagittarius	8	Dhanus
♑	—	Capricornus	9	Makara
♒	—	Aquarius	10	Kumbha
♓	—	Pisces	11	Mina

EXPLANATORY NOTES

The most important reference planes in astronomy are the celestial equator and the ecliptic. The positions of all heavenly bodies are usually given in terms of these planes taking the first point of Aries as the initial point. The celestial equator is the great circle of the celestial sphere in which the plane of the earth's equator cuts the celestial sphere. The apparent path of the Sun in the sky is known as the *ecliptic* and is the most important reference circle in the heavens. It is a great circle cutting the celestial equator at an angle of about $23\frac{1}{2}°$. The angle is 23° 26' in 1999 and known as *obliquity of the ecliptic.* The two points of intersection of the ecliptic with the celestial equator are called the First point of Aries (Vernal Equinox) and the First point of Libra (Autumnal equinox) respectively. The First point of Aries is the ascending node of the Sun in relation to the ecliptic on the equator, when it passes from the south to the north. The position of the heavenly bodies in the sky is indicated by measuring their co-ordinates along the great circle of either the celestial equator or of the ecliptic and at right angles to them.

The position of a body on the celestial globe showing the spherical co-ordinates of a star is shown below.



Here,

P	=	Celestial Pole *(Dhruva)*
γQ♎	=	Celestial equator
K	=	Pole of the ecliptic *(Kadamba)*
γ♋	=	Plane of the ecliptic
γ	=	First point of Aries (Vernal equinox)
♋	=	First point of Cancer (Summer Solstice)
♎	=	First point of Libra (Autumnal equinox)
♑	=	First point of Capricorn (Winter Solstice)
S	=	A heavenly body
PS	=	Great circle through P, S. cutting equator at Q.
γQ	=	Right Ascension $= \alpha$
QS	=	Declination $= \delta$
KS	=	Great circle through K, S. cutting ecliptic at C.
γC	=	Celestial longitude $= \lambda$
CS	=	Celestial latitude $= \beta$

The position of a stellar body may be defined by either its right ascension (α) and declination (δ) or its celestial longitude (λ) and latitude (β).

In order to obtain the *nirayana* (sidereal) longitudes of any celestial objects, the amount of *ayanamsa* is to be deducted from the corresponding values of the tropical *(Sayana)* longitudes.

In the Sidereal or *Nirayana* system the reference circle is the *ecliptic*. We have Vernal equinox when the Sun is at the first point of Aries. So the initial point or reference piont of the zodiac is fundamental for obtaining positions of the heavenly bodies. For measuring celestial longitude in the tropical system, the Vernal equinoctial point, which is one of the intersection points of the ecliptic and the equator has been taken as the initial point. This initial point in the tropical system (*i.e.* V. E. point) does not occupy any fixed position among the stars, it always moves backward in the western direction in the starry heavens due to precession of the equinoxes with an annual motion of about 50".3 completing the circle in about 26000 years. The longitudes measured in this system is called the Tropical or *Sayana* longitude.

But in the Sidereal or Indian system, in order to stabilise the zodiac, a point has been taken as the origin which is permanently fixed on the ecliptic, so that co-ordinates of the fixed stars in the sky do not change. So in the Sidereal system, the reference point is a fixed point on the ecliptic in relation to some prominent stars, whose position is fixed in the sky. The *nirayana* longitudes of stars being nearly invariable, the Indian signs always contain the same star groups in the divisions.

The longitudes of celestial objects are measured from the fixed point on the ecliptic among the stars. The distance of this fixed initial point from the V. E. point (*i.e.* its celestial longitude) is called *Ayanamsa*. The longitude measured from this initial point is called *Nirayana* or Sidereal longitude.

The zodiacs of the above two systems *i.e.* the tropical and the sidereal coincided in 285 A. D. The initial point of the sidereal zodiac was the same as the equinoctial point (*viz.*, First point of Aries) of the Vernal equinox day of 285 A.D. The star Spica (*Chitra* - α Virginis) was very close to the ecliptic and located at 180° (opposite to V. E. point) away from the Vernal equinoctial point on March 22 of 285 A.D. when both the *sayana* and *nirayana* longitudes of the star *Chitra* (Spica) were the same as 180° 00' 03".0.

It is worth mentioning that the time of coincidence of the *Sayana* and *Nirayana* zodiacs was determined by late N. C. Lahiri, former member of the Ephemerides-Commission of the International Astronomical Union (Paris). This value was also computed from the past star positions at the V. E. point of 285 A. D. calculated from the data as available from the Astronomisches Rechen Institut of Heidelberg, Germany, the well known International Astronomical Institute, being the authority in regard to the position of stars and is found to be almost the same. The tropical longitude of the star Spica as computed from the data obtained from this Institute is also very near to 180° on the Vernal Equinox day of 285 A.D. The difference between the two sets of calculations, one by Late N. C. Lahiri and the other is so small that no appreciable change in the value of *Ayanamsa* is at all needed.

According to the above initial point of the *nirayana* zodiac, the value of *Ayanamsa* comes out to be 23° 50' 25" on Jan. 1, 1999 and the nirayana longitude of the star Spica as 179° 59' 03". Due to proper motion, the nirayana longitude of the star Spica *(Chitra)* has, however, diminished by 60" during the period 1714 years from 285 A.D.

For the calculation of *Rasis* and *Nakshatras*, a fixed initial point on the ecliptic has been taken as the origin from which the longitudes are measured. The tropical longitude of this initial point on March 21, 1956 has been adopted as 23° 15' 00". In order to obtain the *nirayana* (Sidereal) longitudes of any celestial objects, the amount of *ayanamsa* is to be subtracted from the corresponding values of the tropical *(Sayana)* longitudes. According to new determination of the location of equinox, this initial value has been revised as 23° 15' 00".658 and is used in computing *ayanamsa* with effect from the 1985 issue.

The Indian Astronomical Ephemeris of the Government of India adopted, on the basis of the recommendations of the Calendar Reform Committee, a value of *Ayanamsa* which was less by only 5".8 than the above. From the 1985 issue a minor correction of 0".658 has been made which has also been followed in this ephemeris according to the *Indian Astronomical Ephemeris*.

Details of the Ephemeris

Nirayana or sidereal longitudes (geocentric apparent) of the Sun, Moon and planets have been given daily for 0*h* Universal Time *i.e.* 0*h* G. M. T. (Greenwich mean midnight) or 5*h* 30*m* a.m. Indian Standard Time (I.S.T.). Latitudes and declinations as also heliocentric longitudes and right ascensions are however given for a slightly earlier epoch i.e. 0*h* E.T. As a result of irregular rotation of the earth, the Greenwich time determined from the earth's rotation has been found inconvenient for calculation of planets' positions, for which *Ephemeris Time* or E.T. is now used. The mean elements of planets have accordingly been given in this book for 0*h* E.T. and for convenience of users the daily positions of planets have been given for 0*h* G.M.T. or U.T. or 5*h* 30*m* a.m. I.S.T.

The *Nirayana Longitude* as given in the Ephemeris is obtainable by subtraction of *Ayanamsa* from the tropical or Sayana longitude given in western ephemerides. The first figure in the given nirayana longitude denotes the sign (indicated by the symbol^s, meaning sign or *Rasi)* of the *Nirayana* or fixed zodiac, *e.g.*, 0 means that the planet is in Mesa (Aries), 1 means Vrisa (Taurus), 2 Mithuna (Gemini), etc.

Sidereal Time is for 12*h* noon local mean time of $82\frac{1}{2}$° East longitude, but is applicable for the whole of India without much modification for local mean noon. L.M.T. is to be used in determining the Sidereal time of any moment, but in finding the longitudes of planets etc. the Standard Time should be made use of.

Apparent Noon is the local mean time of Sun's meridian passage *viz.* the mid-day. The equation of time in the sense of correction applied to the local mean time to obtain the local apparent time, may be deduced as follows : Equation of time = 12*h* – Apparent noon.

Meridian passages of the Moon (shown daily) and planets (at alternate days) given are in local mean time calculated for the Central Meridian of India. *viz.* for $82\frac{1}{2}$° East longitude. With slight correction these may be used in *local mean time* for all other places. M. Pass. of a planet (other than the Moon) requires almost no correction for places in India. For the Moon, the given time of meridian passage should be diminished by 1 minute for Calcutta and eastern India and increased by 1 minute for Delhi, Mumbai and western India. For further west, it should be increased according to the daily variation of the M. Pass. time in proportion to the longitude west of India's central meridian.

The ending times of *Tithi, Nakshatra, Yoga* and *Karana* have been given daily in the Ephemeris as are current at 5-30 a.m. I.S.T. on the day.

The time of phases of the Moon, transits of Moon and planets, and lunar and planetary aspects etc. are given in I.S.T.

The following prefixes and suffixes have been added to the longitude of planets in the daily Ephemeris :—

n, *n* = the planet changes the *nakshatra* by direct (n) or retrograde (*n*) motion, the number of the nakshatra division. *i.e.* the lunar mansion in which the planet is situated on the first day of the month has been shown at the top of the column of longitudes. In case of *Rahu*, the first figure represents the nakshatra of *Rahu* and the second figure that of *Ketu*.

R, *R* = the planet becomes retrograde (**R**), or has already become so (*R*).

D = the planet becomes direct.

s, *s* = the planet sets (s) heliacally, or has already set (*s*)

r = the planet rises heliacally.

(☌, ☍) = the planet is in conjunction ☌ with the Sun or in opposition ☍ to the Sun.

e = the inferior planet has the greatest elongation from the Sun on that day.

The timings of Sunrise and Sunset for Calcutta (Lat. 22° 35' N) as given in this Ephemeris are in I.S.T. The timings relate to the visibility of the *Sun's upper limb*, on the horizon, where time corrections for refraction and Sun's semi-diameter have been included. The sunrise and sunset times of the *Central Station of India* given in I.S.T. is the same as the L.M.T. of the Meridian of $82\frac{1}{2}$°E. Long. relate to the appearance and disappearance of the upper limb of the Sun on the horizon. The Local Mean Time of Sunrise and Sunset for a particular latitude may be used as L.M.T. for all places on the same *latitude*. As a result of refraction, the centre of the Sun becomes visible on the horizon about 2*m* 20*s* before the calculated time of Sunrise and remains so after the time of Sunset. For visibility of the Sun's upper limb, the above correction is about 3*m* 30*s*, the amount of horizontal refraction is taken as 31' and the semi-diameter as 16', so that the centre of the Sun is actually 47' below the below the horizon at such times of rising and setting.

As in the case of the Sun and the Moon, the Lunar Node (*i.e. Rahu*) has also got the mean position as well as the *true* position, the greatest difference between the two being about $1\frac{3}{4}$° degrees. In view of the

fact, that we are concerned only with the true or apparent position in case of planets, the position of *True Rahu* has been given in the daily ephemeris more accurately taking further terms of corrections from 1986 issue and for facility of the users the mean position has also been given daily. Motion of True *Rahu* is not uniform, sometime it becomes direct even.

National Calendar— In accordance with the recommendations of the Calendar Reform Committee, appointed by the Govt. of India in 1952, a reformed **Indian National Calendar** was introduced with effect from March 22, 1957 which was the starting date of the new National Calendar—*Saka 1879, Chaitra 1*. The year of National Calendar begins with *Chaitra 1* on March 22 in a Gregorian common year and on March 21 in a leap year. The months of the Calendar have got fixed number of days :

The beginning dates of months are as follows :— Chaitra : Mar. 22 (Mar. 21 in a leap-year); Vaisakha -Apr. 21; Jyaistha-May 22; Asadha-June 22; Sravana-July 23; Bhadra -Aug. 23; Asvina-Sept. 23; Kartika-Oct. 23; Agrahayana-Nov. 22, Pausa-Dec. 22; Magha-Jan. 21 and Phalguna-Feb. 20.

Time changes in India

Originally cities of India used to maintain local time of her own. Before 1.1.1880 some provinces used time same as Calcutta local time. Afterwards the old Railway time, the same as the local time of Madras (now Chennai) *5h 20m 50s* ahead of G.M.T.) began to come into use. Thereafter, most cities gradually adopted this time.

Till 1905, the local Mean Time (L.M.T.) of the Madras observatory (*5h 20m 50s* ahead of G.M.T.) was used all over India by the Postal and Railway authorities. From January 1, 1906 the half hour time zone was adopted for the purpose and I.S.T. was introduced which related to the L.M.T. of 82° 30'E. Meridian, *i.e. 5h 30m* ahead of G.M.T. Since then this time is being used as I.S.T. except for the short period as stated below :—

From 1st September, 1942 to 14th October, 1945, the Indian Standard Time was advanced by one hour all over India including modern Bangladesh and Pakistan for purposes of day-light saving during the period and was thus *6h 30m* ahead of G.M.T. Any recorded time of this period should therefore be reduced by *1 hour* to get I.S.T.

Calcutta and many places in Bengal and some places of the adjacent provinces like Bihar, Assam and Orissa used to maintain local time instead of the standard time up to end of September 1941. The local standard time is known in some countries simply as local time.

Bengal Time was introduced from 1.10.41 during war time by Bengal Govt. which was more than one hour from I.S.T. Actually it was the Standard time of Burma (Myanmar). *Calcutta time* is less by *36m 39s* from *Bengal time*. After that date there were changes of varying nature in the time reckoning of different places as stated below.

In some parts of Bengal and adjoining areas		Reduction to I.S.T.		
	Before 1.10.41—L.M.T. in use			
Calcutta and adjoining areas	Before 1.10.41	Calcutta Local Time	– *0h*	*23m*
Whole of Bengal	From 1.10.41 to 14.5.42	Bengal Time	– *1h*	*0m*
Whole of Bengal	From 15.5.42 to 31.8.42	I.S.T.	*0h*	*0m*
Whole of Bengal	From 1.9.42 to 31.8.47	Bengal Time	– *1h*	*0m*
West Bengal	Since 1.9.1947	I.S.T.	*0h*	*0m*
Assam (Before 1.11.1941-L.M.T.)	From 1.11.41 to 14.5.42 and 1.9.42 to 14.10.45	Same as Bengal Time	– *1h*	*0m*
	From 15.5.42 to 31.8.42 & From 15.10.1945	Same as I.S.T.	*0h*	*0m*
Bihar (Before 1.12.1941-L.M.T.)	From 1.12.41 to 14.5.42 & 1.9.42 to 14.10.45	Same as Bengal Time	– *1h*	*0m*
	From 15.5.42 to 31.8.42	Same as I.S.T.	*0h*	*0m*
Rest of India (except Goa) (Before 1.1.1880 - L.M.T.)	From 1.1.1880 to 31.12.1906	L.M.T. of Chennai *5h 21m* ahead of G.M.T.		+*9m*
	From 1.1.1907 to 31.8.1942	Same as I.S.T.	*0h*	*0m*
	From 1.9.42 to 14.10.45	Same as Bengal Time	– *1h*	*0m*
	From 15.10.45	Same as I.S.T.	*0h*	*0m*
Goa (Before 18.7.1911 - L.M.T.)	From 18.7.1911 to 31.8.42	Same as I.S.T.	*0h*	*0m*
	From 1.9.42. to 14.10.45	Same as Bengal Time	– *1h*	*0m*
	From 15.10.45	Same as I.S.T.	*0h*	*0m*
Bengal Time relates to L.M.T. of 97° 30' E. Meridian				

East Pakistan observed Bengal time for civil purposes and Pakistan standard time, same as I.S.T. for Railways and Postal work etc. upto 30.9.1951. From 1.10.51 Bangladesh (former East Pakistan) standard time is *30m* more than I.S.T. and Pakistan (former West Pakistan) standard time is *30m* less than I.S.T.

Beginning Dates of Lunar months in 1999

Lunar month: Sukladi (Sudi) MUKHYAMANA — Maharastra, Gujarat, Andhra Pradesh, Karnataka & W. B.	Lunar month: Krishnadi (Vadi) GAUNAMANA — U. P., Bihar, M. P. Orissa, Rajasthan & N. W. India	Lunar Month begins from
	1998	*h m*
Pausa (Sukla)	Pausa (Sudi)	Dec. 18 28 12
	1999	
Pausa (Krishna)	Magha (Vadi)	Jan. 2 8 20
Magha (Sukla)	Magha (Sudi)	Jan. 17 21 16
Magha (Krishna)	Phalguna (Vadi)	Jan. 31 21 37
Phalguna (Sukla)	Phalguna (Sudi)	Feb. 16 12 09
Phalguna (Krishna)	Chaitra (Vadi)	Mar. 2 12 29
Chaitra (Sukla)	Chaitra (Sudi)	Mar. 17 24 18
Chaitra (Krishna)	Vaisakha (Vadi)	Mar. 31 28 19
Vaisakha (Sukla)	Vaisakha (Sudi)	Apr. 16 9 52
Vaisakha (Krishna)	Jyaistha (Vadi)	Apr. 30 20 25
Jyaistha (Sukla) - Mala	*Jyaistha (Sudi) - Adhika*	May 15 17 35
Jyaistha (Krishna) - Mala	*Asadha (Vadi) - Adhika*	May 30 12 10

Lunar month: Sukladi (Sudi) MUKHYAMANA — Maharastra, Gujarat, Andhra Pradesh, Karnataka & W. B.	Lunar month: Krishnadi (Vadi) GAUNAMANA — U. P., Bihar, M. P. Orissa, Rajasthan & N. W. India	Lunar Month begins from
	1999	*h m*
Jyaistha (Sukla-Nija)	Jyaistha (Sudi-Suddta)	June 13 24 33
Jyaistha (Krishna-Nija)	Asadha (Vadi-Suddta)	June 28 27 07
Asadha (Sukla)	Asadha (Sudi)	July 13 7 54
Asadha (Krishna)	Sravana (Vadi)	July 28 16 55
Sravana (Sukla)	Sravana (Sudi)	Aug. 11 16 39
Sravana (Krishna)	Bhadrapada (Vadi)	Aug. 26 29 18
Bhadrapada (Sukla)	Bhadrapada (Sudi)	Sept. 9 27 32
Bhadrapada (Krishna)	Asvina (Vadi)	Sept. 25 16 21
Asvina (Sukla)	Asvina (Sudi)	Oct. 9 17 04
Asvina (Krishna)	Kartika (Vadi)	Oct. 24 26 32
Kartika (Sukla)	Kartika (Sudi)	Nov. 8 9 23
Kartika (Krishna)	Margasirsa (Vadi)	Nov. 23 12 34
Margasirasa (Sukla)	Margasirsa (Sudi)	Dec. 7 28 02
Margasirsa (Krishna)	Pausa (Vadi)	Dec. 22 23 01
Pausa (Sukla)	Pausa (Sudi)	Jan(2000)6 23 44

Phases of the Moon and Apsides, 1999

New Moon	First Quarter	Full Moon	Last Quarter	☽ at Perigee (Nearest to the Earth)	☽ at Apogee (Farthest from the Earth)
d h m	*d h m*	*d h m*	*d h m*	*d h m*	*d h m*
Dec. 18 28 12	Dec. 26 16 16	Jan. 2 08 20	Jan. 9 19 52	Jan. 26 26 56	Jan. 11 17 11
Jan. 17 21 16	Jan. 24 24 45	Jan. 31 21 37	Feb. 8 17 28	Feb. 20 20 03	Feb. 8 14 21
Feb. 16 12 09	Feb. 23 08 13	Mar. 2 12 29	Mar. 10 14 10	Mar. 20 5 45	Mar. 8 10 38
Mar. 17 24 18	Mar. 24 15 48	Mar. 31 28 19	Apr. 9 08 21	Apr. 17 10 55	Apr. 4 27 00
Apr. 16 09 52	Apr. 22 24 31	Apr. 30 20 25	May 8 22 58	May 15 20 37	May 2 11 43
May 15 17 35	May 22 11 04	May 30 12 10	June 7 09 50	June 13 6 08	May 29 13 45
June 13 24 33	June 20 23 43	June 28 27 07	July 6 17 27	July 11 11 38	June 25 21 00
July 13 07 54	July 20 14 30	July 28 16 55	Aug. 4 22 57	Aug. 7 29 05	July 23 11 14
Aug. 11 16 39	Aug. 19 07 17	Aug. 26 29 18	Sept. 2 27 47	Sept. 2 23 33	Aug. 19 28 56
Sept. 9 27 32	Sept. 17 25 36	Sept. 25 16 21	Oct. 2 09 32	Sept. 28 22 12	Sept. 16 24 10
Oct. 9 17 04	Oct. 17 20 30	Oct. 24 26 32	Oct. 31 17 34	Oct. 26 18 27	Oct 14 19 19
Nov. 8 09 23	Nov. 16 14 33	Nov. 23 12 34	Nov. 29 28 48	Nov. 23 27 24	Nov. 11 11 00
Dec. 7 28 02	Dec. 16 06 20	Dec. 22 23 01	Dec. 29 19 34	Dec. 22 16 24	Dec. 8 16 33
Jan. 6 23 44	Jan. 14 19 04	Jan. 21 10 11	Jan. 28 13 27		

Longitude of Sun at Full Moon and New Moon, 1999

At Full Moon: Date	At Full Moon: Long of Sun	At New Moon: Date	At New Moon: Long of Sun	At Full Moon: Date	At Full Moon: Long of Sun	At New Moon: Date	At New Moon: Long of Sun
h m	*s ° '*	*h m*	*s ° '*	*h m*	*s ° '*	*h m*	*s ° '*
Jan. 2 08 20	8 17 24	Jan. 17 21 16	9 03 14	July 28 16 55	3 11 07	Aug. 11 16 39	3 24 30
Jan. 31 21 37	9 17 29	Feb. 16 12 09	10 03 18	Aug. 26 29 18	4 09 27	Sept. 9 27 32	4 22 56
Mar. 2 12 29	10 17 23	Mar. 17 24 18	11 02 53	Sept. 25 16 21	5 08 05	Oct. 9 17 04	5 21 53
Mar. 31 28 19	11 16 56	Apr. 16 09 52	0 01 54	Oct. 24 26 32	6 07 09	Nov. 8 09 23	6 21 26
Apr. 30 20 25	0 15 59	May 15 17 35	1 00 23	Nov. 23 12 34	7 06 41	Dec. 7 28 02	7 21 31
May 30 12 10	1 14 35	June 13 24 33	1 28 29	Dec. 22 23 01	8 06 34	Jan. 6 23 44	8 21 53
June 28 27 07	2 12 54	July 13 07 54	2 26 26	Jan.2000 21 10 11	9 06 35	(2000 A.D.)—	—

Beginning Dates of Islamic Calendar, 1999

The *beginning* dates of the different months of the Islamic Calendar for the year 1999 determined on the basis of the first visibility of the lunar crescent after the Newmoon day calculated for the Central Station of India ($82\frac{1}{2}°$ E) are as follows.

The months of the Islamic Calendar actually begin from the sunset times of preceding day but in practice the months are taken to begin from *the next day.*

1419 Hejira				1420 Hejira				1420 Hejira			
Shawwal	(29)	Jan.	20	Muharram	(29)	Apr.	18	Rajab	(30)	Oct.	11
Z'ulquada	(30)	Feb.	18	Safar	(30)	May	17	Shaban	(30)	Nov.	10
Zulhijja	(29)	Mar.	20 *	Rabiul awwal	(29)	June	16	Ramadan	(30)	Dec.	10
				Rabius' sani	(29)	July	15	Shawwal	(30)	2000 A.D. Jan.	9
				Jamadu'l awwal	(30)	Aug.	13	Z'ulquada	(29)	Feb.	8 **
				Jamadu's sani	(29)	Sept.	12	Zulhijja	(29)	Mar.	8

* In the extreme northern part of India, the Moon is likely to be visible one day earlier and consequently the month Zulhijja would begin on Mar. 19 in those regions.

** In the the extreme northwestern and southern parts of India, the Moon is likely to be visible one day earlier and consequently the month Z'ulquada will begin on Feb. 7, 2000 A.D.

Beginning Dates of Vedic Solar Months & Indian Seasons, 1999

Month	Season	Date	Month	Season	Date
Tapas-Makara	WINTER (SISIRA-1st Month)	Dec. 22	Nabhas-Karkata	RAINS (VARSA-1st Month)	June 22
Tapasya-Kumbha	WINTER (SISIRA-2nd Month)	Jan. 21	Nabhasya-Simha	RAINS (VARSA-2nd Month)	July 23
Madhu-Mina	SPRING (VASANTA-1st Month)	Feb. 20	Isa-Kanya	AUTUMN (SARAT-1st Month)	Aug. 23
Madhava-Mesha	SPRING (VASANTA-2nd Month)	Mar. 22	Urja-Tula	AUTUMN (SARAT-2nd Month)	Sept. 23
Sukra-Vrisa	SUMMER (GRISHMA-1st Month)	Apr. 21	Sahas-Vrichika	(HEMANTA-1st Month)	Oct. 23
Suci-Mithuna	SUMMER (GRISHMA-2nd Month)	May 22	Sahasya-Dhanus	(HEMANTA-2nd Month)	Nov. 22
			Tapas-Makara	(WINTER-1st Month)	Dec. 22

Uttarayana from 22nd December & Dakshinayana from 22nd June

Equinoxes and Solstices, 1999

			h	m				h	m
Sun at Perigee	Jan.	3	18	36	Sun at Apogee	July	6	27	59
Vernal Equinox	Mar.	21	7	16	Autumnal Equinox	Sept.	23	17	01
Summer Solstice	June	21	25	19	Winter Solstice	Dec.	22	13	14

Phases of the Moon, 2000 A. D.

(Time in I.S.T.)

New Moon	d	h	m	First Quarter	d	h	m	Full Moon	d	h	m	Last Quarter	d	h	m
Jan.	6	23	44	Jan.	14	19	04	Jan.	21	10	10	Jan.	28	13	27
Feb.	5	18	33	Feb.	12	28	51	Feb.	19	21	57	Feb.	27	09	23
Mar.	6	10	47	Mar.	13	12	29	Mar.	20	10	14	Mar.	28	05	51
Apr.	4	23	42	Apr.	11	19	00	Apr.	18	23	11	Apr.	26	25	00
May	4	09	42	May	10	25	30	May	18	13	04	May	26	17	25
June	2	17	44	June	9	08	59	June	16	27	57	June	25	06	30
July	1	24	50	July	8	18	23	July	16	19	25	July	24	16	32
July	31	07	55	Aug.	7	06	32	Aug.	15	10	43	Aug.	22	24	21
Aug.	29	15	49	Sept.	5	21	57	Sept.	13	25	07	Sept.	21	06	58
Sept.	27	25	23	Oct.	5	16	29	Oct.	13	14	23	Oct.	20	13	29
Oct.	27	13	28	Nov.	4	12	57	Nov.	11	26	45	Nov.	18	20	54
Nov.	25	28	41	Dec.	4	09	25	Dec.	11	14	33	Dec.	18	06	11
Dec.	25	22	52												

CALENDARS OF INDIA (SOLAR)

Beginning dates of different solar months of India during 1999 are given below.

Time (in I.S.T.) of Transit of Sun into *Nirayana Rasi*	Name of Month	National Calendar	Bengal and Assam*	Orissa Punjab Haryana etc. **	Tamil Nadu	Kerala †
1999 *h m*		1920 S.E.				
Makara Jan. 14 17 01	Magha	Jan. 21	Jan. 15	Jan. 14	Thai Jan. 14	Makaram Jan. 15
Kumbha Feb. 13 6 00	Phalguna	Feb. 20	Feb. 14	Feb. 12	Masi Feb. 13	Kumbham Feb. 13
		1921 S.E.				
Mina Mar. 14 26 50	Chaitra	**Mar. 22**	Mar. 16	Mar. 14	Panguni Mar. 15	Minam Mar. 15
Mesha Apr. 14 11 16	Vaisakha	Apr. 21	**Apr. 15**	**Apr. 14**	**Chittirai Apr. 14**	Medam Apr. 14
Vrisha May 15 8 05	Jyaistha	May 22	May 16	May 15	Vaikasi May 15	Edavan May 15
Mithuna June 15 14 38	Asadha	June 22	June 16	June 15	Ani June 15	Midhunam June 16
Karkata July 16 25 31	Sravana	July 23	July 18	July 16	Adi July 17	Karkitaka July 17
Simha Aug. 17 9 57	Bhadra	Aug. 23	Aug. 18	Aug. 17	Avani Aug. 17	**Chimgam Aug.17**
Kanya Sept. 17 9 54	Asvina	Sept. 23	Sept. 18	Sept. 17	Puruttasi Sept. 17	Kanni Sept. 17
Tula Oct. 17 21 51	Kartika	Oct. 23	Oct. 18	Oct. 17	Arppisi Oct. 18	Thulam Oct. 18
Vrischika Nov. 16 21 38	Agrahayana	Nov. 22	Nov. 17	Nov. 16	Kartigai Nov. 17	Vrishchikam Nov. 17
Dhanus Dec. 16 12 15	Pausa	Dec. 22	Dec. 17	Dec. 16	Margali Dec. 16	Dhanu Dec. 16
Makara Jan. 14 22 59 (2000) A.D.	Magha	Jan. 21	Jan. 15	Jan. 14	Thai Jan. 15	Makaram Jan. 15

Year beginning shown in **capital** letters

* In Assam the month names are almost the same like Vaisakha, Jyaistha etc. but have different spelling and pronounciation *e.g.* Bohag, Jeth, etc.

** In Orissa actually the months start from the next day according to local custom. Month names are also mentioned in Orissa as Mesha, Vrisha etc. as well as Vaisakha, Jyaistha etc.

† Month names are also mentioned in Kerala as Mesha, Vrishava etc.
In determining the beginning of solar months, sunrise rule is followed in Orissa and Punjab *(day of transit of Sun)*, 18 ghatika rule in Kerala, sunset rule in Tamil Nadu and midnight rule in West Bengal.

Beginning of Eras in 1999

English New Year Day	1999 A. D.	begins on	January 1, 1999
Indian New Year Day (Solar) (National Calendar)	1921 Sakabda	begins on	March 22
Vikram Samvat (Lunar)	2056	begins on	March 18 (Lunar Chaitradi)
Vikram Samvat (Lunar)	2056	begins on	November 9 (Lunar Kartikadi)
Vikram Samvat (Solar)	2056	begins on	January 14 (Solar-Punjab)
Saka Era (Lunar)	1921	begins on	March 18 (Lunar)
Saka Era (Solar)	1921	begins on	April 14-15 (Solar)
Bengali Era (Solar)	1406	begins on	April 15
Amli San (Lunar)	1407	begins on	Sept. 22 (Bhadra S 12)
Fusli San (Lunar)	1407	begins on	Sept. 26 (Bhadra K 1)
Kollam Era (Solar)	1175	begins on	August 17 (Simhadi)
Hejira (Islamic Calendar—Lunar)	1420	begins on	April 17 at sunset *i.e.* from Apr. 18 (1 Muharram)
Buddha Nirvana Era (Lunar)	2543	begins on	April 30 (Vaisakha S 15)
Mahavira Nirvana Era (Lunar)	2526	begins on	November 9 (Kartika S 1)
Kaliyuga Era (Solar-elapsed)	5100	begins on	April 16
Jovian Year (Barhaspatya Varsa) (60 year cycle of Jupiter)	27 Vijaya	begins on	August 28 (North Indian usage)
" " "	13 Pramathin	begins on	March 18 (Lunar Chaitradi), & April 14 (Solar)— (South Indian usage)
Vedanga Jyotisha Year *	5 Idvatsara	begins on	January 18 (Magha Sukladi)
Year of Julian Period (current)	6712	begins on	January 14
Parsi New Year (Shahenshahi)	1369	begins on	August 22 (1 Farvardin)
Jewish New Year (Rosh Hashanah)	5760	begins on	September 10 (1Tishri) at Sunset *i.e.* from Sept. 11
Nabanassar Era (Babylon)	2748	begins on	April 24
Japanese Year	2659	begins on	January 1
Chinese Year (Ji-mao)	4636	begins on	February 16

* 5 year cycle of Vedanga Jyotish year is : (1) Samvatsara (2) Parivatsara (3) Idavatsara (4) Anuvatsara and (5) Idvatsara

Mean Distance of Sun, Moon and Planets from the Earth (in miles)

Planet	Maximum distance (Miles)	Minimum distance (Miles)	Planet	Maximum distance (Miles)	Minimum distance (Miles)
Sun	94,600,000	91,500,000	Jupiter	597,000,000	362,000,000
Moon	253,000	222,000	Saturn	1,023,000,000	773,000,000
Mercury	136,900,000	49,100,000	Uranus	1,946,000,000	1,594,000,000
Venus	160,900,000	25,700,000	Neptune	2,891,000,000	2,654,000,000
Mars	247,000,000	34,000,000	Pluto	4,506,000,000	2,605,000,000

Duration of Daylight

The duration of twilight and daylight is determined according to the dates of four cardinal points *viz.* two equinoxes and two solstices. At equinoxes, the Sun's rays are perpendicular to the Equator. At solstices the Sun's rays are perpendicular either to the Tropic of Cancer $23\frac{1}{2}°$ north of the equator or to the Tropic of Capricorn $23\frac{1}{2}°$ south of the equator.

March 20-21 : On the day of *Vernal Equinox,* when the Sun's rays are perpendicular to the equator, the equator itself represents the daily path of the Sun, and consequently the two hemisphere are equally lighted and nights and days have the same duration at all latitude except at the Poles which are grazed by the Sun's rays for 24 hours. From 21st March onwards the length of daylight gradually increases in the Northern hemisphere and decreases in the Southern hemisphere. During 6 months' period from March 21 to Sept. 23, there is continuous daylight at the North Pole and continuous darkness at the South Pole.

June 21 : On the day of *Summer solstice,* when the Sun shines on the whole of Arctic Circle, the Suns's rays are perpendicular to the Tropic of Cancer $23\frac{1}{2}°$ north of the equator. At that period duration of daylight at a place becomes longest for the year in the Northern hemisphere and duration of darkness is longest for the year in the Southern hemisphere.

September 22-23 : On the day of *Autumnal Equinox,* when the Sun's rays are perpendicular to the equator, the day and night again become equal at anywhere on the Earth's surface except at the Poles. During 6 months' period from Sept. 23 to March 21, there is continuous darkness at the North Pole and continuous daylight at the South Pole.

Dec. 21-22 : On the day of *Winter Solstice,* the Sun's rays are perpendicular to the Tropic of Capricorn $23\frac{1}{2}°$ south of the equator. From the day of Winter Solstice when the North Pole is turned away from the Sun, the daylight gradually increases and the duration of night remain longer than day in the Northern hemisphere. In the southern hemisphere duration of daylight gradually decreases but remain longer than night and finally day and night become equal on the Vernal Equinox day on March 20-21.

Daylight continues for 6 months at the North Pole from March 21 to September 23 and at that period darkness continues for 6 months at the South pole. Again from September 23 to March 21, darkness continues for 6 months at the North Pole and daylight for 6 months at the South Pole.

On the two equinox days the lengths of day and night are equal. But due to atmospheric refraction the Sun is seen to rise a few minutes earlier and to set a few minutes later than the calculated times and as a result the actual duration of the day is about 6 to 7 minutes longer than the theoretical value.

Duration of longest daylight or dark nights at different latitudes (North or South)

Latitude	Longest day or shortest night	Latitude	Longest day or shortest night
0° (Equator)	12 hours	67°.4	1 month
31°	14 hours	69°.8	2 months
49°	16 hours	78°.2	4 months
66°5	24 hours	90° (Poles)	6 months

INDIAN EPHEMERIS, 1999

Elements of the Planetary Orbits at 0^h E.T. or 5-29.0 a.m. I.S.T. on 1st January 1999

(On Sidereal or *Nirayana basis)*

The elements of Sun, Moon and Moon's Node are based on *Indian Astronomical Ephemeris* while those of Mercury to Pluto are obtained from Heliocentric Osculating Orbital Elements.

	Mean Longitide				Perigee or Perihelion				Ascending Node				Inclination of Orbit			Eccentricity (=e)
	s	°	'	"	s	°	'	"	s	°	'	"	°	'	"	
Sun	8	16	22	09	8	19	04	49		—				—		0.016718
Moon	1	28	30	02	0	18	47	32	4	00	33	22	5	08	43	0.05490
Mercury	5	22	38	45	1	23	35	42	0	24	28	30	7	00	18	0.20563
Venus	9	22	32	38	3	17	24	25	1	22	49	40	3	23	41	0.00678
Mars	4	20	03	52	4	20	03	52	0	25	42	25	1	50	59	0.09331
Jupiter	11	10	10	01	11	21	46	55	2	16	37	30	1	18	17	0.04860
Saturn	0	13	50	12	0	13	50	12	2	29	48	42	2	29	07	0.05462
Uranus	9	15	18	13	9	15	18	13	1	20	12	07	0	46	23	0.04375
Neptune	9	09	08	08	11	28	28	01	3	17	55	36	1	46	04	0.01103
Pluto	7	03	51	36	6	20	36	00	2	26	28	33	17	08	11	0.24634

The above elements are referred to the mean ecliptic and equinox of date.

	Sidereal Period	Synodic Period	Mean daily motion			Mean distance from Sun (compared to Earth)		
						Astronomical	Kilometres	Miles
	days	days	°	'	"		*	*
Moon	27.3216615	29.531	13	10	35.0	0.00257		
Mercury	87.969256	115.878	4	05	32.4	0.38710	57900000	36000000
Venus	224.70080	583.921	1	36	07.7	0.72333	108200000	67200000
Earth	365.25636	—	0	59	08.2	1.00000	149600000	93000000
Mars	686.97982 (1.9)	779.936	0	31	26.5	1.52369	227900000	141600000
Jupiter	4332.589 (11.86)	398.884	0	04	59.1	5.20280	778300000	483600000
Saturn	10759.23 (29.46)	378.092	0	02	01.9	9.53884	1427000000	886700000
Uranus	30688.45 (84.02)	369.656	0	00	42.0	19.18172	2869000000	1782700000
Neptune	60181.3 (164.77)	367.487	0	00	21.5	30.05824	4498000000	2794900000
Pluto	90737.2 (248.42)	366.733	0	00	14.1	39.42043	5900000000	3666100000
Rahu	6793.470 (18.60)	346.620	0	03	10.8	—	—	—
Moon's Perigee	3232.600 (8.85)	411.785	0	06	40.9	—	—	—

Miscellaneous Astronomical Data

Ayanamsa on Jan. 1, 1998, Mean = 23° 49' 45".0, True = 23° 49' 40".7; Nutation in longitude = –4".29.
Ayanamsa on Jan. 1, 1999, Mean = 23° 50' 35".17, True = 23° 50' 25".39; Nutation in longitude = –9".78.
Ayanamsa on Jan. 1, 2000, Mean = 23° 51' 25".46, True = 23° 51' 11".54; Nutation in longitude = –13.92
Precession rate in long. per Trop. year = 50".29, Per Sid. year = 50".3; rate per day = +0".14
Obliquity of the ecliptic on Jan. 1, 1999, Mean = 23° 26' 21".92, True = 23° 26' 13".77; Nutation in obliquity = –8".15
Obliquity of the ecliptic on Jan. 1, 2000, Mean = 23° 26' 21".44, True = 23° 26' 15".68; Nutation in obliquity = –5".76
JULIAN DAY NUMBER (elapsed at Jan. 1, Greenwich Mean Noon) = 245.1180 completed
'KALIYUGA' DAY NUMBER (elapsed at Jan. 1, Ujjain Midnight) = 186.2715 completed
Length of the tropical year (equinox to equinox) = 365.242190*d* = 365*d* 5*h* 48*m* 45*s*.2
Length of the sidereal year (fixed star to fixed star) = 365.256363*d* = 365*d* 6*h* 9*m* 9*s*.8
Anomalistic year (perigee to perigee) = 365.259635*d*. Eclipse year (node to node) = 346.620075*d*
Length of the lunar month (new-moon to new-moon) = 29.530589*d* = 29*d* 12*h* 44*m* 2*s*.9
Anomalistic month = 27.554550*d*. Draconic month (node to node) = 27.212221*d* = 27*d* 5*h* 5*m* 35*s*.9
Tropical month (equinox to equinox) = 27.321582*d* = 27*d* 7*h* 43*m* 4.7*s*
Sidereal month (fixed star to fixed star) = 27.321662*d* = 27*d* 7*h* 43*m* 11.6*s*
Length of the day : Mean Sidereal 23*h* 56*m* 4.09053*s* of mean Solar time
Length of the day : Mean Solar 24*h* 03*m* 56.55537*s* of mean Sidereal time
Mean duration of *tithi* = 23*h* 37*m* 28*s*.096; Mean duration of *nakshatra* = 24*h* 17*m* 9*s*.317
Rotation of the Earth in mean solar time = 23*h* 56*m* 4.091*s*
Sidereal day in mean solar time = 23*h* 56*m* 4.091*s* (Mean sidereal day)
Mean solar day in sidereal time = 24*h* 3*m* 56.555*s*
Lunar day between the risings of Moon = 24*h* 48*m* 45.838*s*
Plane of galaxy : Asc. Node = 8^s 6°. Inclination = 60° 11'
Centre of our galaxy : Long = 8^s 2°. Lat. = –6°, Light years = 26000
Speed of the Earth moving around the Sun = 29.79 km. or 18.51 miles per sec. or roughly 66600 miles
Time to reach light on Earth from Sun is about 8.3 minutes and from Moon is about 1.3 seconds
Solar Parallax = 8."79 ; Speed of light per sec. = 1,86.000 miles (approx.) Astronomical Unit = 149,597,870 km
*Mean distance of Moon from the Earth = 384401 km. = 238856 miles (1 km. = 0.621372 miles)

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0ʰ U.T. or 5-30 a.m. I.S.T. Sun ☉ Longitude	Sun ☉ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
			h m s	20 Nakshatra s ° ' "	° '	s ° ' "	° '	° '	h m			9/23 naks s ° '
1 F	1	11	18 41 54	8 16 15 54	23S 03	2 01 07 37	4 S 22	18N59	23 40	5	14	3 29 02
2 St	2	12	18 45 51	17 17 02	22 58	2☍15 42 12	3 32	19 34	—	6	15	28 55
3 Su	3	13	18 49 48	18 18 10	22 53	3 00 00 17	2 30	18 53	0 40	7	16	28 50
4 M	4	14	18 53 44	19 19 18	22 47	3 13 56 36	1 20	17 02	1 37	8	18	28 47
5 Tu	5	15	18 57 41	20 20 25	22 41	3 27 28 18	0 S 07	14 17	2 31	9	19	28 46
6 W	6	16	19 01 37	8 21 21 33	22 34	4 10 35 07	1 N 04	10 53	3 21	10	20	3 28 47
7 Th	7	17	19 05 34	22 22 42	22 27	4 23 18 47	2 10	7 04	4 08	11	21	28 48
8 F	8	18	19 09 30	23 23 50	22 20	5 05 42 38	3 08	3N 03	4 53	12	22	28 50
9 St	9	19	19 13 27	24 24 58	22 12	5 17 51 03	3 56	1S 00	5 36	13	22	28 51
10 Su	10	20	19 17 24	25 26 07	22 03	5 29 48 55	4 33	4 57	6 19	14	23	28 51
11 M	11	21	19 21 20	8n26 27 16	21 54	6 11 41 15	4 59	8 40	7 01	15	24	3 28 50
12 Tu	12	22	19 25 17	27 28 24	21 45	6 23 32 51	5 11	12 02	7 45	16	25	28 47
13 W	13	23	19 29 13	28 29 32	21 35	7 05 28 05	5 10	14 57	8 30	17	26	28 43
14 Th	14	24	19 33 10	8 29 30 40	21 25	7 17 30 44	4 56	17 15	9 16	18	27	28 38
15 F	15	25	19 37 06	9 00 31 49	21 15	7 29 43 43	4 28	18 50	10 05	18	28	28 33
16 St	16	26	19 41 03	9 01 32 57	21 04	8 12 09 05	3 47	19 32	10 56	19	29	3 28 28
17 Su	17	27	19 44 59	02 34 05	20 52	8☌24 48 01	2 54	19 16	11 47	20	30	28 24
18 M	18	28	19 48 56	03 35 12	20 40	9 07 40 51	1 51	18 01	12 39	21	1	28 21
19 Tu	19	29	19 52 53	04 36 18	20 28	9 20 47 14	0 N 41	15 47	13 31	22	2	28 20
20 W	20	30	19 56 49	05 37 24	20 16	10 04 06 24	0 S 32	12 41	14 23	23	3	28 20
21 Th	21	1	20 00 46	9 06 38 29	20 03	10 17 37 23	1 44	8 53	15 13	24	4	3 28 21
22 F	22	2	20 04 42	07 39 33	19 50	11 01 19 07	2 52	4S 33	16 03	25	5	28 22
23 St	23	3	20 08 39	08 40 36	19 36	11 15 10 41	3 50	0N 03	16 54	26	6	28 23
24 Su	24	4	20 12 35	n 09 41 38	19 22	11 29 10 59	4 36	4 41	17 45	27	7	28 24
25 M	25	5	20 16 32	10 42 40	19 07	0 13 18 48	5 05	9 05	18 37	1	8	28 25
26 Tu	26	6	20 20 28	9 11 43 40	18 53	0 27 32 22	5 16	13 01	19 32	3	9	3 28 24
27 W	27	7	20 24 25	12 44 39	18 38	1 11 49 17	5 08	16 12	20 28	4	10	28 23
28 Th	28	8	20 28 22	13 45 37	18 22	1 26 06 21	4 40	18 25	21 26	5	12	28 21
29 F	29	9	20 32 18	14 46 33	18 06	2 10 19 41	3 55	19 27	22 25	6	13	28 19
30 St	30	10	20 36 09	9 15 47 29	17 50	2 24 25 05	2 57	19 17	23 22	7	14	3 28 17
31 Su	31	11	20 40 11	9 16 48 24	17S 34	3☍08 18 26	1 S 48	17N55	—	8	15	3 28 16

Lunar Magha (Sukladi-Sudi) begins from January 17, 21h 16m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	12 03 17	10 42	13 10	6 30	16 50	19 00	14 12	13 31	6 17	17 03	6 41	17 25
3	12 04 13	10 46	13 13	6 26	16 43	18 52	14 05	13 23	17	04	42	27
5	12 05 08	10 51	13 15	6 21	16 36	18 44	13 57	13 16	18	06	43	28
7	12 06 01	10 56	13 18	6 17	16 30	18 37	13 50	13 08	18	07	43	29
9	12 06 52	11 01	13 21	6 13	16 23	18 29	13 42	13 01	19	08	43	31
11	12 07 41	11 06	13 23	6 08	16 16	18 21	13 35	12 53	19	10	44	32
13	12 08 28	11 11	13 25	6 04	16 10	18 14	13 28	12 46	19	11	44	34
15	12 09 12	11 17	13 28	6 00	16 03	18 06	13 20	12 38	19	13	44	35
17	12 09 54	11 22	13 30	5 55	15 57	17 58	13 13	12 30	6 19	17 14	6 44	17 36
19	12 10 33	11 28	13 32	5 51	15 50	17 51	13 06	12 23	19	15	44	38
21	12 11 09	11 34	13 34	5 46	15 44	17 43	12 58	12 15	19	17	43	40
23	12 11 41	11 40	13 36	5 41	15 37	17 36	12 51	12 08	19	18	43	41
25	12 12 11	11 46	13 38	5 37	15 31	17 28	12 43	12 00	18	20	43	42
27	12 12 38	11 52	13 39	5 32	15 24	17 21	12 36	11 53	18	21	42	44
29	12 13 01	11 58	13 41	5 27	15 18	17 13	12 28	11 45	17	22	41	45
31	12 13 21	12 04	13 43	5 22	15 11	17 06	12 21	11 38	6 16	17 24	6 41	17 46

Sun enters : Makara (Sidereal) Jan. 14, 17*h* 01*m*. ***Trop. Aquarius*** (♒): Jan. 20, 18*h* 07*m*

Full Moon : 2nd, 8*h* 20*m* & 31st, 21*h* 37*m* 1st Jan. : Pluto M. Pass. 9*h* 55*m* ***Last Quarter* : 9th, 19*h* 52*m***

Date	*Nirayana* Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	18 naks.	21 naks.	14 naks.	25 naks.	1 naks.	22 naks.	21 naks.	17 naks.	10/23 naks.
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
1	7 27 26	9 1 33	5 24 33	10 28 06	0 2 56	9 17 07	9 7 13	7 15 16	4 00 33
2	7n 28 50	2 48	25 02	28 15	2 56	17 10	7 15	15 18	00 30
3	8 0 15	4 03	25 32	28 24	2 57	17 13	7 17	15 20	00 27
4	1 41	5 18	26 01	28 33	2 57	17 16	7 20	15 23	00 24
5	3 07	6 33	26 30	28 42	2 58	17 20	7 22	15 25	00 21
6	8 4 34	9 7 48	5 26 59	10 28 52	0 2 59	9 17 23	9 7 24	7 15 27	4 00 17
7	6 02	n 9 04	27 28	29 01	2 59	17 26	7 26	15 29	00 14
8	7 30	10 19	27 57	29 11	3 00	17 29	7 27	15 31	00 11
9	8 59	11 34	28 25	29 21	3 02	17 33	7 31	15 32	00 08
10	10 29	12 49	28 53	29 30	3 03	17 36	7 33	15 34	00 05
11	8n 11 59	9 14 04	5 29 21	10 29 41	0 3 04	9 17 39	9 7 35	7 15 36	4n 00 02
12	13 29	15 19	5 29 49	10 29 51	3 05	17 43	7 37	15 38	3 29 58
13	15 00	16 34	6 0 17	11 0 01	3 07	17 46	7 40	15 40	29 55
14	16 32	17 49	0 45	0 11	3 09	17 49	7 42	15 42	29 52
15	s 18 04	19 05	1 12	0 22	3 10	17 53	7 44	15 44	29 49
16	8 19 36	9 20 20	6 1 39	11 0 32	0 3 12	9 17 56	9 7 46	7 15 46	3 29 46
17	21 09	21 35	2 06	0 43	3 14	17 59	7 49	15 47	29 42
18	22 43	n 22 50	2 32	0 54	3 16	18 03	7 51	15 49	29 39
19	24 17	24 05	2 59	1 05	3 18	18 06	7 53	15 51	29 36
20	n 25 51	25 20	3 25	1 16	3 21	18 10	7 56	15 52	29 33
21	8 27 26	9 26 35	6 3 51	11 1 27	0 3 23	9 18 13	9 7 58	7 15 54	3 29 30
22	8 29 02	27 50	4 17	1 38	3 26	18 17	♂8 00	15 56	29 27
23	9 0 38	9 29 05	4 42	1 50	3 28	18 20	8 02	15 57	29 23
24	2 15	10 0 19	5 08	2 01	3 31	18 24	8 05	15 59	29 20
25	3 52	1 34	5 33	2 13	3 34	18 27	8 07	16 01	29 17
26	9 5 30	10 2 49	6 5 57	11 2 25	0 3 37	9 18 30	9 8 09	7 16 02	3 29 14
27	7 09	4 04	n 6 22	2 36	3 40	18 34	8 11	16 04	29 11
28	n 8 48	5 19	6 46	2 48	3 43	18 37	8 14	16 05	29 08
29	10 28	n 6 34	7 10	3 00	3 46	18 41	8 16	16 07	29 04
30	12 09	7 48	7 34	n 3 12	3 49	18 44	8 18	16 08	29 01
31	9 13 50	10 9 03	6 7 57	11 3 24	0 3 53	9 18 48	9 8 21	7 16 09	3 28 58

Lunar Pausa Krishnadi (Magha Vadi) begins from January 2, 8h 20m
Lunar Magha Krishnadi (Phalguna Vadi) begins from January 31, 21h 37m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '
1	0 N36	22S33	1 S19	22S21	1N54	5S27	1 S14	4 S20	2 S33	7N57	0 S38	18S05	0N18	19S38
3	0 20	22 59	1 21	21 55	1 55	5 49	1 14	4 13	2 32	7 58	0 38	18 03	0 18	19 37
5	0 N04	23 20	1 24	21 26	1 55	6 10	1 14	4 05	2 32	7 59	0 38	18 01	0 18	19 36
7	0 S11	23 37	1 26	20 54	1 56	6 31	1 13	3 57	2 31	8 00	0 38	18 00	0 18	19 35
9	0 25	23 49	1 28	20 20	1 57	6 51	1 13	3 19	2 30	8 01	0 38	17 58	0 18	19 34
11	0 39	23 57	1 30	19 44	1 58	7 11	1 12	3 41	2 30	8 02	0 38	17 56	0 18	19 33
13	0 52	24 00	1 31	19 05	1 58	7 31	1 12	3 33	2 29	8 04	0 38	17 54	0 18	19 32
15	1 04	23 58	1 32	18 25	1 59	7 50	1 12	3 24	2 29	8 06	0 38	17 52	0 18	19 31
17	1 15	23 50	1 33	17 42	2 00	8 09	1 11	3 15	2 28	8 08	0 38	17 50	0 18	19 30
19	1 25	23 37	1 34	16 57	2 01	8 28	1 11	3 06	2 28	8 10	0 38	17 49	0 18	19 29
21	1 35	23 19	1 34	16 10	2 01	8 46	1 11	2 57	2 27	8 12	0 38	17 47	0 18	19 28
23	1 43	22 55	1 34	15 22	2 02	9 03	1 10	2 48	2 26	8 14	0 38	17 45	0 18	19 27
25	1 50	22 25	1 34	14 32	2 03	9 20	1 10	2 38	2 26	8 17	0 38	17 43	0 18	19 26
27	1 56	21 49	1 34	13 40	2 03	9 37	1 10	2 29	2 25	8 19	0 38	17 41	0 18	19 25
29	2 00	21 08	1 33	12 47	2 04	9 53	1 10	2 19	2 25	8 22	0 38	17 39	0 18	19 24
31	2 S03	20S20	1 S32	11S52	2 05	10S09	1 S09	2 S09	2 S24	8N25	0 S38	17S37	0N18	19S23

1st Jan. : Rahu Decli. 13°N 55'

1st Jan. Pluto : Lat. 11°N 23', Decli 10°S 33'

New Moon : 17th, 21*h* 16*m*

First Quarter : 24th, 24h 45m

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0^h U.T. or 5-30 a.m. I.S.T. Sun ☉ Longitude	Sun ☉ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
			h m s	22 Nakshatra s ° ′ ″	° ′	s ° ′ ″	° ′	° ′	h m			9/23 naks s ° ′
1 M	32	12	20 44 08	9 17 49 18	17 S 17	3 21 56 17	0 S 35	15N33	0 17	9	16	3 28 15
2 Tu	33	13	20 48 04	18 50 10	17 00	4 05 16 11	0 N 39	12 23	1 09	10	17	28 15
3 W	34	14	20 52 01	19 51 02	16 43	4 18 17 06	1 49	8 41	1 58	11	18	28 16
4 Th	35	15	20 55 57	20 51 53	16 25	5 00 59 21	2 52	4 41	2 45	12	19	28 17
5 F	36	16	20 59 54	21 52 43	16 07	5 13 24 36	3 45	0N34	3 29	13	20	28 18
6 St	37	17	21 03 51	9n22 53 31	15 49	5 25 35 37	4 27	3 S29	4 13	14	21	3 28 18
7 ☉	38	18	21 07 47	23 54 19	15 31	6 07 36 05	4 57	7 20	4 56	15	22	28 19
8 M	39	19	21 11 44	24 55 05	15 12	6 19 30 16	5 14	10 51	5 39	15	23	28 19
9 Tu	40	20	21 15 40	25 55 51	14 53	7 01 22 50	5 17	13 56	6 23	16	23	28 19
10 W	41	21	21 19 37	26 56 36	14 34	7 13 18 29	5 07	16 28	7 09	17	24	28 19
11 Th	42	22	21 23 33	9 27 57 20	14 14	7 25 21 50	4 43	18 18	7 56	18	25	3 28 19
12 F	43	23	21 27 30	28 58 03	13 55	8 07 37 03	4 06	19 20	8 45	19	26	28 19
13 St	44	24	21 31 26	9 29 58 45	13 35	8 20 07 38	3 17	19 27	9 36	20	27	28 19
14 ☉	45	25	21 35 23	10 00 59 26	13 15	9 02 56 08	2 16	18 34	10 29	21	28	28 19
15 M	46	26	21 39 20	02 00 05	12 54	9 16 03 53	1 N 08	16 41	11 21	22	29	28 20
16 Tu	47	27	21 43 14	10 03 00 43	12 34	9☌29 30 50	0 S 07	13 50	12 14	23	30	3 28 20
17 W	48	28	21 47 13	04 01 19	12 13	10 13 15 29	1 22	10 10	13 06	24	1	28 20
18 Th	49	29	21 51 09	05 01 54	11 52	10 27 15 04	2 34	5 53	13 58	25	2	28 19
19 F	50	30	21 55 06	n 06 02 27	11 31	11 11 25 45	3 37	1S 14	14 49	26	3	28 18
20 St	51	1	21 59 02	07 02 59	11 09	11 25 43 12	4 27	3N32	15 41	27	5	28 17
21 ☉	52	2	22 02 59	10 08 03 28	10 48	0 10 03 05	5 01	8 05	16 34	1	6	3 28 16
22 M	53	3	22 06 55	09 03 56	10 26	0 24 21 26	5 16	12 11	17 28	2	7	28 15
23 Tu	54	4	22 10 52	10 04 22	10 04	1 08 35 04	5 11	15 33	18 24	3	8	28 15
24 W	55	5	22 14 49	11 04 47	9 42	1 22 41 33	4 48	17 58	19 20	4	9	28 15
25 Th	56	6	22 18 45	12 05 09	9 20	2 06 39 12	4 09	19 18	20 17	5	10	28 16
26 F	57	7	22 22 42	10 13 05 28	8 58	2 20 26 47	3 14	19 27	21 13	7	11	3 28 17
27 St	58	8	22 26 38	14 05 46	8 36	3 04 03 25	2 10	18 27	22 08	8	12	28 18
28 ☉	59	9	22 30 35	10 15 06 03	8 S 13	3 17 28 17	1 S 00	16N26	23 00	9	13	3 28 19

Lunar Phalguna (Sukladi-Sudi) begins from February 16, 12h 09m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	12 13 30	12 07	13 43	5 20	15 08	17 02	12 17	11 34	6 16	17 24	6 40	17 47
3	12 13 44	12 14	13 45	5 15	15 02	16 54	12 10	11 26	15	26	40	48
5	12 13 56	12 20	13 46	5 10	14 56	16 47	12 02	11 19	14	27	39	50
7	12 14 05	12 26	13 48	5 05	14 49	16 40	11 55	11 11	13	28	38	51
9	12 14 10	12 32	13 49	5 00	14 43	16 32	11 47	11 04	12	29	37	52
11	12 14 13	12 38	13 50	4 54	14 37	16 25	11 40	10 56	11	30	36	53
13	12 14 12	12 44	13 52	4 49	14 30	16 18	11 33	10 48	10	32	34	54
15	12 14 09	12 50	13 53	4 43	14 24	16 10	11 26	10 41	09	33	33	56
17	12 14 02	12 55	13 54	4 38	14 18	16 03	11 18	10 33	6 08	17 34	6 32	17 57
19	12 13 53	13 00	13 55	4 32	14 12	15 56	11 11	10 26	06	35	30	58
21	12 13 41	13 05	13 56	4 26	14 05	15 49	11 03	10 18	05	36	29	17 59
23	12 13 26	13 09	13 57	4 20	13 59	15 41	10 56	10 11	03	37	27	18 00
25	12 13 09	13 13	13 58	4 14	13 53	15 34	10 48	10 03	02	38	26	01
27	12 12 49	13 15	13 59	4 08	13 47	15 27	10 41	9 55	6 00	39	24	02
28	12 12 39	13 16	14 00	4 05	13 44	15 24	10 37	9 52	5 59	17 39	6 23	18 02

Sun enters: Kumbha (Sidereal) Feb. 13, 6*h* 00*m*. ***Trop. Pisces*** (♓): Feb. 19, 8*h* 17*m*

Last Quarter : 8th, 17*h* 28*m* 1st Feb. : Pluto M.Pass. 7*h* 57*m* ***New Moon : 16th, 12h 09m***

Nirayana Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.

Date	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	22 naks.	24 naks.	15 naks.	26 naks.	1 naks.	22 naks.	21 naks.	17 naks.	9/23 naks.
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
1	9 15 32	10 10 18	6 8 20	11 3 36	0 3 56	9 18 51	9 8 23	7 16 11	3 28 55
2	17 15	11 32	8 43	3 49	4 00	♂ 18 55	8 25	16 12	28 52
3	18 58	12 47	9 05	4 01	4 03	18 58	8 27	16 13	28 48
4	♂ 20 42	14 02	9 28	4 14	4 07	19 02	8 30	16 15	28 45
5	n 22 27	15 16	9 49	4 26	4 11	19 05	8 32	16 16	28 42
6	9 24 13	10 16 31	6 10 11	11 4 39	0 4 15	9 19 09	9 8 34	7 16 17	3 28 39
7	25 59	17 45	10 32	4 51	4 19	19 12	8 36	16 18	28 36
8	27 45	n 19 00	10 53	5 04	4 23	19 16	8 38	16 19	28 33
9	9 29 33	20 14	11 13	5 17	4 27	19 19	8 41	16 21	28 29
10	10 1 21	21 29	11 34	5 30	4 32	19 23	8 43	16 22	28 26
11	10 3 10	10 22 43	6 11 53	11 5 43	0 4 36	9 19 26	9 8 45	7 16 23	3 28 23
12	n 4 59	23 57	12 13	5 56	4 41	19 30	8 47	16 24	28 20
13	6 48	25 12	12 32	6 09	4 45	19 33	8 49	16 25	28 17
14	8 38	26 26	12 50	6 22	4 50	19 37	8 51	16 26	28 13
15	10 28	27 40	13 09	6 35	4 55	19 40	8 54	16 27	28 10
16	10 r12 18	10 28 55	6 13 27	11 6 48	0 4 59	9 19 44	8 56	7 16 28	3 28 07
17	14 08	11 0 09	13 44	7 02	5 04	19 47	8 58	16 29	28 04
18	15 58	1 23	14 01	7 15	5 09	19 50	9 00	16 29	28 01
19	17 47	n 2 37	14 17	7 29	5 14	19 54	9 02	16 30	27 58
20	n 19 35	3 51	14 34	7 42	5 20	19 57	9 04	16 31	27 54
21	10 21 21	11 5 05	6 14 49	11 7 56	0 5 25	9 20 01	9 9 06	7 16 32	3 27 51
22	23 06	6 19	15 04	8 09	5 30	20 04	9 08	16 32	27 48
23	24 49	7 33	15 19	8 23	5 35	20 07	9 10	16 33	27 45
24	26 29	8 47	15 33	8 37	5 41	20 11	9 12	16 34	27 42
25	28 07	10 01	15 47	8 50	5 46	20 14	9 14	16 34	27 38
26	10 29 40	11 11 15	6 16 00	11 9 04	0 5 52	9 20 17	9 9 16	7 16 35	3 27 35
27	11 1 10	12 28	16 13	9 18	5 58	20 20	9 18	16 35	27 32
28	11 n 2 34	11 13 42	6 16 25	11 9 32	0 6 03	9 20 24	9 9 20	7 16 36	3 27 29

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '
1	2S 04	19S54	1S 31	11 S25	2N05	10S16	1S 09	2S 04	2S 24	8N27	0S 38	17S36	0N 18	19S23
3	2 05	18 58	1 30	10 28	2 06	10 31	1 09	1 54	2 23	8 30	0 38	17 34	0 18	19 22
5	2 04	17 55	1 28	9 31	2 06	10 45	1 09	1 44	2 23	8 33	0 38	17 32	0 18	19 21
7	2 01	16 47	1 26	8 33	2 07	10 59	1 08	1 34	2 22	8 36	0 38	17 30	0 18	19 20
9	1 56	15 33	1 24	7 33	2 08	11 12	1 08	1 23	2 22	8 40	0 38	17 28	0 18	19 19
11	1 49	14 13	1 21	6 33	2 08	11 25	1 08	1 13	2 21	8 43	0 38	17 26	0 18	19 18
13	1 40	12 48	1 19	5 33	2 09	11 37	1 08	1 02	2 21	8 47	0 38	17 24	0 18	19 17
15	1 28	11 18	1 15	4 31	2 09	11 49	1 08	0 52	2 20	8 51	0 38	17 22	0 17	19 16
17	1 14	9 43	1 12	3 29	2 10	12 00	1 07	0 41	2 20	8 54	0 38	17 20	0 17	19 15
19	0 57	8 05	1 08	2 27	2 10	12 10	1 07	0 30	2 19	8 58	0 38	17 18	0 17	19 14
21	0 37	6 24	1 05	1 25	2 10	12 20	1 07	0 19	2 19	9 02	0 38	17 16	0 17	19 13
23	0S 15	4 43	1 00	0 S22	2 11	12 29	1 07	0S 08	2 19	9 06	0 38	17 15	0 17	19 12
25	0 N10	3 03	0 56	0N41	2 11	12 37	1 07	0N03	2 18	9 11	0 38	17 13	0 17	19 11
27	0 36	1 26	0 51	1 43	2 11	12 45	1 06	0 14	2 18	9 15	0 38	17 11	0 17	19 10
28	0 N50	0S39	0 S49	2N15	2N11	12S49	1 S06	0N20	2 S18	9N17	0S 38	17S10	0N17	19S10

1st Feb. : Rahu Decli. 14° N 10'

1st Feb. Pluto : Lat. 11°N 29', Decli 10°S 35'

First Quarter : 23rd, 8h 13m

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0^h U.T. or 5-30 a.m. I.S.T. Sun ☉ Longitude	Sun ☉ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
				24 Nakshatra								9/23 naks
			h m s	s ° ' "	° '	s ° ' "	° '	° '	h m			s ° '
1 M	60	10	22 34 31	10 16 06 17	7S 50	4 00 40 40	0N 13	13N33	23 48	10	14	3 28 19
2 Tu	61	11	22 38 28	17 06 30	7 28	4☊13 40 00	1 24	10 03	—	11	15	28 18
3 W	62	12	22 42 24	18 06 41	7 05	4 26 25 56	2 29	6 08	0 37	11	16	28 17
4 Th	63	13	22 46 21	n 19 06 50	6 42	5 08 58 35	3 26	2N 02	1 22	12	17	28 14
5 F	64	14	22 50 18	20 06 57	6 19	5 21 18 41	4 12	2S 06	2 06	13	18	28 10
6 St	65	15	22 54 14	10 21 07 02	5 56	6 03 27 41	4 46	6 04	2 50	14	19	3 28 07
7 ☉	66	16	22 58 11	22 07 05	5 32	6 15 27 51	5 06	9 45	3 33	15	20	28 03
8 M	67	17	23 02 07	23 07 08	5 09	6 27 22 14	5 14	13 01	4 17	16	21	28 00
9 Tu	68	18	23 06 04	24 07 09	4 46	7 09 14 34	5 08	15 44	5 02	17	22	27 58
10 W	69	19	23 10 00	25 07 08	4 22	7 21 09 09	4 49	17 49	5 48	18	23	27 57
11 Th	70	20	23 13 57	10 26 07 05	3 59	8 03 10 40	4 17	19 08	6 36	19	24	3 27 57
12 F	71	21	23 17 53	27 07 01	3 35	8 15 23 55	3 33	19 35	7 25	20	25	27 58
13 St	72	22	23 21 50	28 06 55	3 11	8 27 53 35	2 38	19 05	8 16	21	25	28 00
14 ☉	73	23	23 25 47	10 29 06 48	2 48	9 10 43 42	1 33	17 37	9 08	22	26	28 01
15 M	74	24	23 29 43	11 00 06 39	2 24	9 23 57 17	0N 22	15 09	10 00	23	27	28 02
16 Tu	75	25	23 33 40	11 01 06 28	2 00	10 07 35 43	0 S 52	11 47	10 53	24	29	3 28 02
17 W	76	26	23 37 36	02 06 14	1 37	10☌21 38 14	2 05	7 39	11 45	25	30	28 00
18 Th	77	27	23 41 33	n 03 05 59	1 13	11 06 01 38	3 12	3S 00	12 38	26	1	27 56
19 F	78	28	23 45 29	04 05 42	0 49	11 20 40 22	4 08	1N55	13 32	27	2	27 51
20 St	79	29	23 49 26	05 05 23	0 26	0 05 27 08	4 47	6 44	14 26	1	3	27 46
21 ☉	80	30	23 53 22	11 06 05 02	0S 02	0 20 13 58	5 08	11 10	15 21	2	4	3 27 40
22 M	81	1	23 57 19	07 04 39	0N22	1 04 53 33	5 08	14 52	16 18	3	5	27 36
23 Tu	82	2	0 01 16	08 04 13	0 46	1 19 20 07	4 48	17 37	17 15	4	6	27 32
24 W	83	3	0 05 12	09 03 45	1 09	2 03 30 06	4 11	19 13	18 13	5	8	27 31
25 Th	84	4	0 09 09	10 03 15	1 33	2 17 22 02	3 20	19 38	19 09	6	9	27 31
26 F	85	5	0 13 05	11 11 02 43	1 57	3 00 56 08	2 19	18 53	20 03	7	10	3 27 32
27 St	86	6	0 17 02	12 02 08	2 20	3 14 13 42	1 12	17 06	20 56	8	11	27 33
28 ☉	87	7	0 20 58	13 01 30	2 44	3 27 16 30	0 S 02	14 26	21 45	9	12	27 34
29 M	88	8	0 24 55	14 00 50	3 07	4 10 06 20	1 N 07	11 06	22 32	10	13	27 33
30 Tu	89	9	0 28 51	11 15 00 09	3 30	4 22 44 45	2 12	7 19	23 18	11	14	3 27 30
31 W	90	10	0 32 48	11n15 59 25	3N54	5☊05 12 59	3 N09	3N16	—	12	15	3 27 25

Lunar Chaitra (Sukladi-Sudi) begins from March 17, 24h 18m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	12 12 27	13 17	14 00	4 02	13 41	15 20	10 34	9 48	5 59	17 40	6 22	18 03
3	12 12 03	13 16	14 01	3 55	13 34	15 13	10 26	9 40	57	41	21	04
5	12 11 37	13 14	14 02	3 49	13 28	15 06	10 19	9 33	55	41	19	05
7	12 11 10	13 10	14 03	3 42	13 22	14 58	10 11	9 25	53	42	17	06
9	12 10 41	13 04	14 04	3 35	13 16	14 51	10 04	9 17	52	43	15	06
11	12 10 10	12 55	14 05	3 28	13 10	14 44	9 56	9 10	50	44	13	07
13	12 09 39	12 45	14 07	3 21	13 04	14 37	9 49	9 02	48	45	12	08
15	12 09 06	12 33	14 08	3 13	12 58	14 30	9 41	8 54	46	45	10	09
17	12 08 32	12 20	14 09	3 05	12 52	14 23	9 34	8 47	5 44	17 46	6 08	18 10
19	12 07 57	12 06	14 10	2 58	12 45	14 16	9 26	8 39	42	47	06	10
21	12 07 22	11 52	14 11	2 50	12 39	14 09	9 19	8 31	40	48	04	11
23	12 06 47	11 38	14 13	2 42	12 33	14 02	9 11	8 24	39	48	02	12
25	12 06 10	11 25	14 14	2 33	12 27	13 55	9 04	8 16	37	49	6 00	13
27	12 05 34	11 13	14 15	2 25	12 21	13 48	8 56	8 08	35	50	5 58	13
29	12 04 58	11 03	14 17	2 16	12 15	13 41	8 49	8 01	33	50	56	14
31	12 04 22	10 53	14 18	2 07	12 09	13 34	8 41	7 53	5 31	17 51	5 54	18 15

*Sun enters : **Mina*** (Sidereal) Mar. 14, 26*h* 50*m* ***Trop. Aries*** (♈) : Mar. 21, 7*h* 16*m*

Full Moon : 2nd; 12*h* 29*m* & 31st, 28*h* 19*m* 1st. Mar. : Pluto M.Pass. 6*h* 08*m* ***Last Quarter*** **: 10th, 14*h* 10*m***

Date	*Nirayana* Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	26 naks.	26 naks.	15 naks.	26 naks.	1 naks.	22 naks.	21 naks.	17 naks.	9/23 naks.
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
1	11 3 53	11 14 56	6 16 37	11 9 46	0 6 09	9 20 27	9 9 22	7 16 36	3 27 26
2	5 06	n 16 09	16 48	10 00	6 15	20 30	9 24	16 37	27 23
3	c 6 12	17 23	16 58	10 14	6 21	20 33	9 26	16 37	27 19
4	7 12	18 36	17 08	10 28	6 27	20 37	9 28	16 38	27 16
5	8 03	19 50	17 18	10 42	6 33	20 40	9 30	16 38	27 13
6	11 8 46	11 21 03	6 17 26	11 10 56	0 6 39	9 20 43	9 9 31	7 16 38	3 27 10
7	9 21	22 17	17 35	11 10	6 45	20 46	9 33	16 38	27 07
8	9 47	23 30	17 42	11 24	6 51	20 49	9 35	16 39	27 04
9	10 04	24 43	17 49	11 38	6 58	20 52	9 37	16 39	27 00
10	R 10 12	25 56	17 55	11 53	7 04	20 55	9 38	16 39	26 57
11	11 10 11	11 27 09	6 18 01	11 12 07	0 7 10	9 20 58	9 9 40	7 16 39	3 26 54
12	10 01	28 22	18 06	12 21	7 17	21 01	9 42	16 39	26 51
13	*s* 9 43	11n29 35	18 10	12 35	7 23	21 04	9 44	R 16 39	26 48
14	9 17	0 0 48	18 14	12 50	7 30	21 07	9 45	16 39	26 44
15	8 44	2 01	18 17	13 04	7 36	21 10	9 47	16 39	26 41
16	11 8 04	0 3 14	6 18 19	11 13 18	0 7 43	9 21 13	9 9 48	7 16 39	3 26 38
17	7 19	4 27	18 21	13 33	7 50	21 16	9 50	16 39	26 35
18	6 30	5 39	R 18 22	13 47	7 56	21 19	9 52	16 39	26 32
19	♂ 5 37	6 52	18 22	14 02	8 03	21 21	9 53	16 39	26 29
20	4 43	8 04	18 21	s 14 16	8 10	21 24	9 55	16 39	26 25
21	11 *n* 3 47	0 9 17	6 18 19	11 14 31	0 8 17	9 21 27	9 9 56	7 16 38	3 26 22
22	2 52	10 29	18 17	14 45	8 24	21 30	9 57	16 38	26 19
23	1 59	11 42	18 14	15 00	8 31	21 32	n, 9 59	16 38	26 16
24	1 08	n 12 54	18 11	15 14	8 38	21 35	10 00	16 37	26 13
25	11 0 21	14 06	18 06	15 29	8 45	21 38	10 02	16 37	26 09
26	10 29 37	0 15 18	6 18 01	11 15 43	0 8 52	9 21 40	9 10 03	7 16 37	3 26 06
27	*r* 28 58	16 30	17 55	15 58	8 59	21 43	10 04	16 36	26 03
28	28 25	17 42	17 48	16 12	9 06	21 45	10 06	16 36	26 00
29	27 57	18 54	17 41	n 16 27	9 13	21 48	10 07	16 35	25 57
30	27 35	20 06	17 32	16 41	9 21	21 50	10 08	16 35	25 54
31	10 27 18	0 21 17	6 17 23	11 16 56	0 9 28	9 21 54	9 10 09	7 16 34	3 25 50

Lunar Phalguna Krishnadi (Chaitra Vadi) begins from March 2, 12h 29m
Lunar Chaitra Krishnadi (Vaisakha Vadi) begins from March 31, 28h 19m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '
1	1 N04	0N05	0 S46	2N46	2N11	12S53	1 S06	0N25	2 S17	9N19	0 S38	17S09	0N17	19S09
3	1 33	1 27	0 42	3 48	2 11	12 59	1 06	0 36	2 17	9 24	0 38	17 07	0 17	19 08
5	2 02	2 37	0 36	4 50	2 11	13 05	1 06	0 48	2 17	9 28	0 38	17 05	0 17	19 08
7	2 28	3 32	0 31	5 52	2 11	13 10	1 06	0 57	2 16	9 33	0 38	17 03	0 17	19 07
9	2 52	4 12	0 25	6 53	2 11	13 15	1 06	1 10	2 16	9 38	0 38	17 02	0 17	19 06
11	3 12	4 33	0 20	7 53	2 11	13 19	1 06	1 22	2 16	9 42	0 38	17 00	0 17	19 05
13	3 27	4 35	0 14	8 53	2 11	13 22	1 06	1 33	2 15	9 47	0 38	16 58	0 17	19 04
15	3 34	4 18	0 08	9 52	2 10	13 25	1 06	1 44	2 15	9 52	0 38	16 57	0 17	19 04
17	3 35	3 45	0 S01	10 50	2 09	13 26	1 05	1 56	2 15	9 57	0 38	16 55	0 17	19 03
19	3 27	2 57	0N05	11 48	2 09	13 27	1 05	2 07	2 14	10 02	0 38	16 53	0 17	19 02
21	3 12	2 00	0 11	12 44	2 08	13 27	1 05	2 19	2 14	10 07	0 39	16 52	0 17	19 02
23	2 51	0N57	0 18	13 39	2 07	13 27	1 05	2 30	2 14	10 12	0 39	16 50	0 17	19 01
25	2 25	0S06	0 24	14 32	2 06	13 26	1 05	2 42	2 13	10 17	0 39	16 49	0 17	19 00
27	1 55	1 05	0 31	15 24	2 04	13 23	1 05	2 53	2 13	10 22	0 39	16 47	0 17	19 00
29	1 24	1 58	0 37	16 15	2 03	13 21	1 05	3 04	2 13	10 27	0 39	16 46	0 17	18 59
31	0N 53	2S 42	0N 44	17N04	2N01	13S17	1S 05	3N 16	2S 13	10N32	0 S39	16S44	0N 17	18S58

1st March : Rahu Decli. 14°N 08'

1st March Pluto : Lat. 11°N 37' Decli 10°S 31'

New Moon : 17th, 24*h* 18*m*

First Quarter : 24th, 15h 48m

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0ʰ U.T. or 5-30 a.m. I.S.T. Sun ⊙ Longitude	Sun ⊙ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
			h m s	27 Nakshatra s ° ' "	° '	s ° ' "	° '	° '	h m			9/23 naks s ° '
1 Th	91	11	0 36 45	11 16 58 39	4N17	5 17 31 58	3 N 56	0S 53	0 02	13	16	3 27 17
2 F	92	12	0 40 41	17 57 51	4 40	5 29 42 34	4 32	4 56	0 45	14	16	27 08
3 St	93	13	0 44 38	18 57 01	5 03	6 11 45 46	4 55	8 45	1 28	15	17	26 58
4 ☉	94	14	0 48 34	19 56 09	5 26	6 23 42 57	5 05	12 11	2 12	16	18	26 48
5 M	95	15	0 52 31	20 55 15	5 49	7 05 36 02	5 02	15 07	2 56	17	19	26 39
6 Tu	96	16	0 56 27	11 21 54 19	6 12	7 17 27 39	4 46	17 25	3 42	18	20	3 26 31
7 W	97	17	1 00 24	22 53 22	6 35	7 29 21 12	4 17	18 59	4 29	18	21	26 26
8 Th	98	18	1 04 20	23 52 23	6 57	8 11 20 44	3 37	19 43	5 17	19	22	26 23
9 F	99	19	1 08 17	24 51 22	7 20	8 23 30 54	2 47	19 34	6 07	20	23	26 22
10 St	100	20	1 12 14	25 50 19	7 42	9 05 56 38	1 47	18 27	6 57	21	24	26 23
11 ☉	101	21	1 16 10	11 26 49 15	8 04	9 18 42 51	0N 41	16 23	7 48	22	25	3 26 23
12 M	102	22	1 20 07	27 48 09	8 26	10 01 53 53	0 S 29	13 24	8 39	23	26	26 23
13 Tu	103	23	1 24 03	28 47 01	8 48	10 15 32 44	1 40	9 36	9 31	24	27	26 22
14 W	104	24	1 28 00	11n29 45 51	9 10	10 29 40 16	2 48	5 09	10 23	25	28	26 18
15 Th	105	25	1 31 56	0 00 44 39	9 32	11 14 14 24	3 46	0S 15	11 16	26	29	26 11
16 F	106	26	1 35 53	0 01 43 25	9 53	11♉29 09 39	4 30	4N45	12 11	27	30	3 26 03
17 St	107	27	1 39 49	02 42 09	10 14	0 14 17 32	4 56	9 32	13 07	2	1	25 53
18 ☉	108	28	1 43 46	03 40 52	10 36	0 29 27 39	5 02	13 43	14 05	3	3	25 43
19 M	109	29	1 47 43	04 39 33	10 57	1 14 29 35	4 46	16 59	15 05	4	4	25 35
20 Tu	110	30	1 51 39	05 38 11	11 17	1 29 14 43	4 12	19 04	16 04	5	5	25 28
21 W	111	1	1 55 36	0 06 36 47	11 38	2 13 37 23	3 22	19 52	17 03	6	6	3 25 24
22 Th	112	2	1 59 32	07 35 21	11 58	2 27 35 09	2 22	19 24	17 59	7	7	25 22
23 F	113	3	2 03 29	08 33 53	12 18	3 11 08 21	1 15	17 49	18 53	8	8	25 22
24 St	114	4	2 07 25	09 32 23	12 39	3 24 19 12	0 S 06	15 18	19 43	9	9	25 22
25 ☉	115	5	2 11 22	10 30 50	12 58	4 07 10 55	1 N 02	12 05	20 31	10	10	25 21
26 M	116	6	2 15 18	0 11 29 15	13 18	4 19 46 58	2 05	8 22	21 16	11	11	3 25 19
27 Tu	117	7	2 19 15	n 12 27 38	13 37	5 02 10 42	3 02	4 22	22 00	12	12	25 14
28 W	118	8	2 23 12	13 25 59	13 56	5 14 24 54	3 48	0N14	22 43	13	13	25 07
29 Th	119	9	2 27 08	14 24 18	14 15	5 26 31 45	4 24	3S 52	23 26	14	14	24 56
30 F	120	10	2 31 05	0 15 22 35	14N34	6♉08 32 57	4 N 48	7S 47	—	15	15	3 24 43

Lunar Vaisakha (Sukladi-Sudi) begins from April 16, 9h 52m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	12 04 03	10 49	14 19	2 02	12 06	13 31	8 38	7 49	5 30	17 51	5 53	18 15
3	12 03 28	10 42	14 21	1 53	12 00	13 24	8 30	7 41	28	52	51	16
5	12 02 53	10 36	14 22	1 43	11 54	13 17	8 22	7 34	26	53	49	17
7	12 02 18	10 31	14 24	1 34	11 48	13 10	8 15	7 26	24	54	47	17
9	12 01 45	10 28	14 26	1 24	11 41	13 03	8 07	7 18	22	54	46	18
11	12 01 12	10 25	14 28	1 14	11 35	12 56	8 00	7 11	20	55	44	19
13	12 00 41	10 23	14 30	1 03	11 29	12 49	7 52	7 03	19	56	42	20
15	12 00 11	10 22	14 31	0 53	11 23	12 43	7 44	6 55	17	57	40	21
17	11 59 43	10 21	14 33	0 43	11 17	12 36	7 37	6 47	5 15	17 57	5 38	18 21
19	11 59 16	10 22	14 35	0 32	11 11	12 29	7 29	6 39	13	58	37	22
21	11 58 50	10 22	14 37	0 21	11 05	12 22	7 21	6 32	12	17 59	35	23
23	11 58 27	10 24	14 40	0 11	10 59	12 15	7 14	6 24	10	18 00	33	24
25	11 58 04	10 25	14 42	23 55	10 53	12 08	7 06	6 16	09	00	32	25
27	11 57 44	10 27	14 44	23 44	10 47	12 02	6 58	6 08	07	01	30	26
29	11 57 26	10 30	14 46	23 33	10 40	11 55	6 51	6 00	06	02	29	26
30	11 57 18	10 32	14 47	23 27	10 37	11 51	6 47	5 56	5 05	18 03	5 28	18 27

*Sun enters : **Mesha*** (Sidereal) Apr. 14, 11*h* 16*m*. ***Trop. Taurus*** (♉) : Apr. 20, 18*h* 16*m*

Last Quarter : 9th, 8*h* 21*m* 1st Apr. : Pluto M.Pass. 4*h* 06*m* ***New Moon : 16th, 9h 52m***

Date	*Nirayana* Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	25 naks.	2 naks.	*15 naks.*	27 naks.	1 naks.	22 naks.	22 naks.	*17 naks.*	9/23 naks.
	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′
1	10*R*27 07	0 22 29	6*R*17 14	11☌17 10	0 9 35	9 21 55	9 10 10	7*R*16 34	3 25 47
2	**D** 27 02	23 40	17 03	17 25	9 42	21 57	10 12	16 33	25 44
3	27 03	24 52	16 52	17 39	9 50	21 59	10 13	16 32	25 41
4	27 09	n 26 03	16 40	17 54	9 57	22 02	10 14	16 32	25 38
5	27 20	27 14	16 27	18 08	10 04	22 04	10 15	16 31	25 34
6	10 27 37	0 28 25	6 16 13	11 18 23	0 10 12	9 22 06	9 10 16	7 16 30	3 25 31
7	27 58	0 29 36	15 59	18 37	10 19	22 08	10 17	16 30	25 28
8	28 24	1 0 47	15 44	18 52	10 27	22 10	10 18	16 29	25 25
9	28 54	1 58	15 29	19 06	10 34	22 12	10 19	16 28	25 22
10	10 29 29	3 09	15 12	19 21	10 42	22 14	10 20	16 27	25 19
11	11 0 08	1 4 20	6 14 56	11 19 35	0 10 49	9 22 16	9 10 20	7 16 26	3 25 15
12	0 50	5 30	14 38	19 50	10 57	22 18	10 21	16 25	25 12
13	1 36	6 41	14 20	20 04	s 11 04	22 20	10 22	16 24	25 09
14	2 25	7 51	14 01	20 18	11 12	22 22	10 23	16 23	25 06
15	n 3 18	n 9 01	13 42	20 33	11 19	22 24	10 24	16 22	25 03
16	11 e 4 14	1 10 12	6 13 22	11 20 47	0 11 27	9 22 25	9 10 24	7 16 21	3 25 00
17	5 13	11 22	13 02	21 02	11 35	22 27	10 25	16 20	24 56
18	6 14	12 32	12 42	21 16	11 42	22 29	10 26	16 19	24 53
19	☌7 18	13 42	12 21	r 21 30	11 50	22 30	10 26	16 18	24 50
20	8 25	14 51	11 59	21 45	11 57	22 32	10 27	16 17	24 47
21	11 9 35	1 16 01	6 11 38	11 21 59	0 12 05	9 22 33	9 10 27	7 16 16	3 24 44
22	10 46	17 10	11 16	22 13	12 13	22 35	10 28	16 15	24 40
23	12 00	18 20	10 54	22 27	12 20	22 36	10 28	16 14	24 37
24	13 16	19 29	☍10 32	22 42	12 28	22 38	10 29	16 12	24 34
25	14 35	20 38	10 09	22 56	12 36	22 39	10 29	16 11	24 31
26	11n15 55	1 21 47	6 9 47	11 23 10	0 12 43	9 22 40	9 10 29	7 16 10	3 24 28
27	17 18	n 22 56	9 24	23 24	☌12 51	22 42	10 30	16 09	24 24
28	18 42	24 05	9 02	23 38	12 59	22 43	10 30	16 07	24 21
29	20 09	25 13	8 39	23 52	13 06	22 44	10 30	16 06	24 18
30	11 21 38	1 26 22	6 8 17	11 24 06	0n13 14	9 22 45	9 10 31	7 16 05	3 24 15

Lunar Vaisakha Krishnadi (Jyaistha-Vadi) begins from April 30, 20h 25m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	0 N37	3 S01	0N47	17N28	2N00	13S15	1 S05	3N21	2 S13	10N35	0 S39	16S44	0N17	18S58
3	0 N08	3 30	0 54	18 15	1 58	13 10	1 05	3 33	2 12	10 40	0 39	16 42	0 17	18 58
5	0 S21	3 49	1 00	19 00	1 56	13 05	1 05	3 44	2 12	10 45	0 39	16 41	0 17	18 57
7	0 46	3 57	1 07	19 43	1 53	12 58	1 05	3 55	2 12	10 50	0 39	16 40	0 17	18 57
9	1 10	3 57	1 13	20 24	1 50	12 51	1 05	4 07	2 12	10 55	0 39	16 39	0 17	18 56
11	1 31	3 47	1 20	21 03	1 47	12 44	1 05	4 18	2 12	11 00	0 39	16 38	0 17	18 56
13	1 49	3 29	1 26	21 40	1 44	12 35	1 05	4 29	2 12	11 05	0 39	16 37	0 17	18 55
15	2 05	3 03	1 32	22 14	1 41	12 28	1 05	4 40	2 11	11 11	0 39	16 36	0 17	18 55
17	2 18	2 29	1 38	22 46	1 37	12 17	1 05	4 51	2 11	11 16	0 39	16 35	0 17	18 55
19	2 29	1 49	1 44	23 16	1 33	12 07	1 05	5 02	2 11	11 21	0 39	16 34	0 17	18 54
21	2 37	1 S03	1 50	23 44	1 29	11 57	1 05	5 13	2 11	11 26	0 39	16 33	0 17	18 54
23	2 43	0 N10	1 55	24 09	1 25	11 46	1 06	5 24	2 11	11 31	0 40	16 32	0 17	18 54
25	2 47	0 47	2 00	24 32	1 20	11 36	1 06	5 35	2 11	11 36	0 40	16 31	0 17	18 54
27	2 48	1 50	2 05	24 52	1 15	11 25	1 06	5 46	2 11	11 41	0 40	16 31	0 17	18 54
29	2 47	2 57	2 10	25 09	1 10	11 14	1 06	5 56	2 11	11 46	0 40	16 30	0 17	18 53
30	2 S45	3 N33	2N13	25N17	1N08	11S09	1 S06	6N01	2 S11	11N49	0 S40	16S30	0N17	18S53

1st Apr. : Rahu Decli. 14° N 28' 1st Apr. Pluto : Lat. 11°N 46', Decli 10°S 21'

First Quarter : 22nd, 24h 31m ***Full Moon : 30th, 20h 25m***

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0h U.T. or 5-30 a.m. I.S.T. Sun ☉ Longitude	Sun ☉ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
			h m s	2 Nakshatra s ° ′ ″	° ′	s ° ′ ″	° ′	° ′	h m			9/23 naks s ° ′
1 St	121	11	2 35 01	0 16 20 51	14N 52	6 20 29 51	4 N 59	11S 22	0 09	16	16	3 24 29
2 Su	122	12	2 38 58	17 19 05	15 11	7 02 23 40	4 57	14 30	0 53	16	17	24 15
3 M	123	13	2 42 54	18 17 17	15 29	7 14 15 49	4 42	17 01	1 39	17	18	24 02
4 Tu	124	14	2 46 51	19 15 27	15 46	7 26 08 05	4 14	18 50	2 25	18	19	23 52
5 W	125	15	2 50 47	20 13 35	16 04	8 08 02 53	3 36	19 50	3 13	19	19	23 44
6 Th	126	16	2 54 44	θ 21 11 43	16 21	8 20 03 20	2 47	19 57	4 02	20	20	3 23 38
7 F	127	17	2 58 41	22 09 49	16 38	9 02 13 16	1 50	19 08	4 51	21	21	23 35
8 St	128	18	3 02 37	23 07 53	16 54	9 14 37 05	0 47	17 23	5 40	22	22	23 34
9 Su	129	19	3 06 34	24 05 56	17 11	9 27 19 32	0 N 20	14 45	6 30	23	23	23 34
10 M	130	20	3 10 30	25 03 58	17 27	10 10 25 17	1 S 28	11 18	7 20	24	24	23 34
11 Tu	131	21	3 14 27	n 26 01 59	17 42	10 23 58 09	2 33	7 10	8 10	25	25	3 23 32
12 W	132	22	3 18 23	26 59 58	17 58	11 08 00 19	3 32	2S 30	9 01	26	26	23 28
13 Th	133	23	3 22 20	27 57 55	18 13	11 22 31 16	4 19	2N 27	9 59	27	28	23 21
14 F	134	24	3 26 16	28 55 51	18 28	0 07 27 03	4 49	7 24	10 49	1	29	9/22 23 12
15 St	135	25	3 30 13	0 29 53 46	18 42	0☌22 39 59	5 00	11 58	11 46	2	30	23 01
16 Su	136	26	3 34 10	1 01 51 40	18 57	1 07 59 35	4 50	15 47	12 46	3	1	3 22 51
17 M	137	27	3 38 06	01 49 32	19 11	1 23 14 14	4 19	18 30	13 48	4	2	22 41
18 Tu	138	28	3 42 02	02 47 23	19 24	2 08 13 20	3 31	19 54	14 49	6	3	22 33
19 W	139	29	3 45 59	03 45 12	19 37	2 22 49 09	2 30	19 55	15 49	7	5	22 28
20 Th	140	30	3 49 56	04 42 58	19 50	3 06 57 28	1 21	18 40	16 46	8	6	22 26
21 F	141	31	3 53 52	1 05 40 44	20 03	3 20 37 33	0 S 10	16 20	17 39	9	7	3 22 25
22 St	142	1	3 57 49	06 38 28	20 15	4 03 51 11	1 N 00	13 13	18 29	10	8	22 25
23 Su	143	2	4 01 45	07 36 10	20 27	4 16 41 48	2 05	9 33	19 15	11	9	22 25
24 M	144	3	4 05 42	08 33 51	20 38	4 29 13 34	3 02	5 32	20 00	12	10	22 23
25 Tu	145	4	4 09 39	n 09 31 30	20 50	5 11 30 49	3 49	1N23	20 43	13	11	22 19
26 W	146	5	4 13 35	1 10 29 08	21 00	5 23 37 29	4 25	2S 46	21 25	14	12	3 22 12
27 Th	147	6	4 17 32	11 26 44	21 11	6 05 37 00	4 49	6 46	22 08	14	13	22 03
28 F	148	7	4 21 28	12 24 18	21 21	6 17 32 06	5 01	10 28	22 52	15	13	21 52
29 St	149	8	4 25 25	13 21 52	21 31	6 29 24 59	4 59	13 46	23 36	16	14	21 40
30 Su	150	9	4 29 21	1 14 19 24	21 40	7☍11 17 24	4 44	16 30	—	17	15	3 21 27
31 M	151	10	4 33 18	1 15 16 56	21N49	7 23 10 49	4 N 17	18S 33	0 23	18	16	3 21 15

Lunar Jyaistha (Sukladi-Sudi Mala or *Adhika) begins from May 15, 17h 35m*

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	11 57 10	10 33	14 48	23 21	10 34	11 48	6 43	6 53	5 05	18 03	5 27	18 27
3	11 56 56	10 37	14 50	23 11	10 28	11 41	6 35	5 45	03	04	26	28
5	11 56 44	10 41	14 52	23 00	10 22	11 34	6 27	5 37	02	05	25	29
7	11 56 34	10 45	14 54	22 50	10 16	11 27	6 20	5 29	01	06	24	30
9	11 56 27	10 50	14 56	22 40	10 10	11 21	6 12	5 21	5 00	06	22	31
11	11 56 22	10 56	14 58	22 29	10 03	11 13	6 04	5 13	4 59	07	21	32
13	11 56 20	11 03	15 00	22 19	9 57	11 07	5 56	5 05	58	08	20	33
15	11 56 19	11 09	15 02	22 09	9 51	11 00	5 48	4 57	57	09	19	34
17	11 56 22	11 17	15 04	21 59	9 45	10 53	5 41	4 50	4 56	18 10	5 18	18 35
19	11 56 26	11 26	15 06	21 50	9 38	10 41	5 33	4 42	55	11	18	36
21	11 56 32	11 34	15 07	21 40	9 32	10 39	5 25	4 34	54	12	17	37
23	11 56 41	11 44	15 09	21 31	9 26	10 32	5 17	4 26	54	13	16	37
25	11 56 51	11 54	15 10	21 22	9 20	10 25	5 09	4 18	53	14	16	38
27	11 57 04	12 04	15 12	21 13	9 14	10 18	5 01	4 10	53	15	15	39
29	11 57 18	12 15	15 13	21 04	9 07	10 11	4 54	4 02	52	15	15	40
31	11 57 34	12 26	15 14	20 56	9 01	10 04	4 46	3 54	4 52	18 16	5 14	18 41

*Sun enters : **Vrisha*** (Sidereal) May 15, 8*h* 05*m* - ***Trop. Gemimi*** (♊): May 21, 7*h* 22*m*

Last Quarter : 8th, *22h 58m* 1st May : Pluto M.Pass. 2*h* 06*m* ***New Moon*** **: 15th, 17*h* 35*m***

Date	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	Nirayana Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	27 naks.	5 naks.	*15 naks.*	27 naks.	2 naks.	22 naks.	22 naks.	*17 naks.*	9/23 naks.
	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′
1	11 23 08	1 27 30	6 *R* 7 55	11 24 20	0 13 22	9 22 46	9 10 31	7*R*16 03	3 24 12
2	24 41	28 38	7 33	24 34	13 29	22 47	10 31	16 02	24 09
3	26 15	1 29 46	7 11	24 48	13 37	22 48	10 31	16 01	24 05
4	27 51	2 0 54	*n* 6 49	25 02	13 45	22 49	10 31	15 59	24 02
5	11n29 29	2 01	6 28	25 16	13 52	22 50	10 31	15 58	23 59
6	0 1 09	2 3 09	6 6 07	11 25 29	0 14 00	9 22 51	9 10 31	7 15 56	3 23 56
7	2 51	4 16	5 47	25 43	14 08	22 51	**R** 10 31	15 55	23 53
8	4 35	5 23	5 27	25 57	14 15	22 52	10 31	15 53	23 50
9	6 21	n 6 30	5 07	26 10	14 23	22 53	10 31	15 52	23 46
10	8 09	7 37	4 48	26 24	14 30	22 53	10 31	15 51	23 43
11	0 s 9 58	2 8 44	6 4 29	11 26 38	0 14 38	9 22 54	9 10 31	7 15 49	3 23 40
12	n 11 50	9 50	4 11	26 51	14 46	22 55	10 31	15 47	23 37
13	13 43	10 57	3 53	27 05	14 53	22 55	10 31	15 46	23 34
14	15 38	12 03	3 37	27 18	15 01	22 55	10 31	15 44	23 30
15	17 36	13 09	3 20	27 31	15 08	22 56	10 30	15 43	23 27
16	0 19 35	2 14 14	6 3 05	11 27 45	0 15 16	9 22 56	9 10 30	7 15 41	3 23 24
17	21 35	15 20	2 50	27 58	15 23	22 56	10 30	15 40	/*n* 23 21
18	23 38	16 25	2 36	· 28 11	15 31	22 57	10 30	15 38	23 18
19	n 25 42	17 30	2 22	28 24	**r** 15 38	22 57	10 29	15 37	23 15
20	27 48	18 35	2 10	28 37	15 45	22 57	10 29	15 35	23 11
21	0 29 55	2n19 40	6 1 58	11 28 50	0 15 53	9**R**22 57	9 10 28	7 15 33	3 23 08
22	1 2 04	20 44	1 47	29 03	16 00	22 57	10 28	15 32	23 05
23	4 13	21 48	1 36	29 16	16 08	22 57	10 27	15 30	23 02
24	6 24	22 52	1 27	29 29	16 15	22 57	10 27	15 29	22 59
25	n 8♂35	23 56	1 18	29 42	16 22	22 57	10 26	15 27	22 56
26	1 10 47	2 24 59	6 1 10	11n29 54	0 16 29	9 22 57	9 10 26	7 15 25	3 22 52
27	12 58	26 02	1 03	0 0 07	16 37	22 56	10 25	15 24	22 49
28	15 10	27 05	0 57	0 19	16 44	22 56	10 24	15 22	22 46
29	17 22	28 07	0 52	0 32	16 51	22 56	10 24	15 20	22 43
30	19 32	2 29 09	0 47	0 44	16 58	22 55	10 23	15 19	22 40
31	1n21 42	3 0 11	6 0 43	0 0 57	0 17 05	9 22 55	9 10 22	7☋15 17	3 22 36

Lunar Jyaistha Krishnadi (Mala) (Jyaistha Vadi adhika) begins from May 30, 12h 10m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	2S 44	4N09	2N15	25N24	1N05	11S04	1S 06	6N07	2S 11	11N51	0 S40	16S29	0N17	18S53
3	2 38	5 25	2 19	25 36	1 00	10 53	1 06	6 17	2 11	11 56	0 40	16 29	0 17	18 53
5	2 30	6 44	2 23	25 45	0 55	10 43	1 06	6 28	2 11	12 01	0 40	16 28	0 17	18 53
7	2 21	8 06	2 27	25 52	0 50	10 34	1 06	6 38	2 11	12 06	9 49	16 28	0 17	18 53
9	2 09	9 31	2 30	25 26	0 44	10 25	1 06	6 48	2 11	12 11	0 40	16 28	0 17	18 53
11	1 55	10 59	2 33	25 57	0 39	10 16	1 07	6 58	2 11	12 16	0 40	16 27	0 17	18 53
13	1 40	12 28	2 35	25 56	0 34	10 09	1 07	7 08	2 11	12 20	0 40	16 27	0 17	18 53
15	1 23	13 57	2 37	25 52	0 28	10 02	1 07	7 18	2 11	12 25	0 40	16 27	0 17	18 53
17	1 04	15 27	2 39	25 46	0 23	9 56	1 07	7 28	2 11	12 30	0 40	16 27	0 17	18 54
19	0 44	16 55	2 40	25 37	0 18	9 50	1 07	7 37	2 11	12 34	0 41	16 27	0 17	18 54
21	0 23	18 20	2 41	25 29	0 13	9 46	1 07	7 47	2 11	12 39	0 41	16 27	0 17	18 54
23	0S 02	19 42	2 41	25 11	0 08	9 43	1 08	7 56	2 11	12 43	0 41	16 27	0 17	18 54
25	0N19	20 57	2 41	24 55	0N02	9 41	1 08	8 05	2 11	12 48	0 41	16 27	0 17	18 54
27	0 39	22 06	2 41	24 37	0 S02	9 40	1 08	8 14	2 12	12 52	0 41	16 27	0 17	18 55
29	0 58	23 05	2 39	24 16	0 07	9 40	1 08	8 23	2 12	12 57	0 41	16 28	0 17	18 55
31	1 N16	23N55	2N38	23N53	0 S11	9S41	1 S09	8N32	2 S12	13N01	0 S41	16S28	0N17	18S55

1st May : Rahu Decli. 15°N 21'

1st May Pluto : Lat. 11°N 52', Decli 10°S 11'

First Quarter : 22nd, 11*h* 04*m*

Full Moon : 30th, 12h 10m

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0h U.T. or 5-30 a.m. I.S.T. Sun ☉ Longitude	Sun ☉ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
			h m s	4 Nakshatra s ° ' "	° '	s ° ' "	° '	° '	h m			9/22 naks s ° '
1 Tu	152	11	4 37 14	1 16 14 26	21N58	8 05 06 42	3 N 38	19 S48	1 10	19	17	3 21 05
2 W	153	12	4 41 11	17 11 55	22 06	8 17 06 49	2 50	20 10	1 59	20	18	20 58
3 Th	154	13	4 45 08	18 09 23	22 14	8 29 13 20	1 53	19 37	2 48	21	19	20 53
4 F	155	14	4 49 04	19 06 50	22 21	9 11 28 56	0 50	18 08	3 37	22	20	20 51
5 St	156	15	4 53 01	20 04 17	22 28	9 23 56 59	0 N 17	15 46	4 26	23	21	20 51
6 ☉	157	16	4 56 57	1 21 01 43	22 35	10 06 41 13	1 S 24	12 35	5 15	24	22	3 20 51
7 M	158	17	5 00 54	21 59 09	22 41	10 19 45 29	2 28	8 44	6 04	24	23	20 52
8 Tu	159	18	5 04 50	n 22 56 34	22 47	11 03 13 18	3 27	4 S20	6 53	25	24	20 52
9 W	160	19	5 08 47	23 53 58	22 52	11 17 07 02	4 15	0N26	7 43	27	25	20 49
10 Th	161	20	5 12 43	24 51 21	22 57	0 01 27 04	4 49	5 18	8 35	1	26	20 45
11 F	162	21	5 16 40	1 25 48 44	23 02	0 16 11 02	5 05	9 00	9 29	2	27	3 20 39
12 St	163	22	5 20 37	26 46 06	23 06	1 01 13 16	5 01	14 10	10 27	3	28	20 32
13 ☉	164	23	5 24 33	27 43 28	23 10	1σ16 25 12	4 35	17 27	11 27	4	30	20 24
14 M	165	24	5 28 30	28 40 50	23 14	2 01 36 25	3 50	19 31	12 30	5	1	20 17
15 Tu	166	25	5 32 26	1 29 38 11	23 17	2 16 36 33	2 50	20 12	13 32	6	2	20 11
16 W	167	26	5 36 23	2 00 35 31	23 19	3 01 16 59	1 40	19 29	14 32	7	3	3 20 08
17 Th	168	27	5 40 19	01 32 49	23 21	3 15 32 05	0 S 25	17 31	15 29	8	4	20 07
18 F	169	28	5 44 16	02 30 07	23 23	3 29 19 22	0 N 50	14 35	16 29	9	5	20 07
19 St	170	29	5 48 12	03 27 25	23 25	4 12 39 16	1 59	10 58	17 10	10	6	20 08
20 ☉	171	30	5 52 09	04 24 41	23 26	4 25 34 16	3 00	6 57	17 56	11	7	20 09
21 M	172	31	5 56 06	2 05 21 57	23, 26	5 08 08 11	3 50	2N44	18 41	12	8	3 20 09
22 Tu	173	1	6 00·02	n 06 19 12	23 26	5 20 25 24	4 29	1S 29	19 24	13	9	20 08
23 W	174	2	6 03 59	07 16 26	23 25	6 02 30 26	4 55	5 55	20 06	14	10	20 05
24 Th	175	3	6 07 55	08 13 40	23 25	6 14 27 31	5 08	9 25	20 50	15	11	20 00
25 F	176	4	6 11 52	09 10 53	23 24	6 26 20 24	5 07	12 51	21 34	16	12	19 54
26 St	177	5	6 15 48	2 10 08 06	23 23	7 08 12 18	4 53	15 46	22 19	17	13	3 19 47
27 ☉	178	6	6 19 45	11 05 18	23 21	7 20 05 50	4 27	18 03	23 07	18	14	19 40
28 M	179	7	6 23 41	12 02 30	23 18	8☋02 03 06	3 49	19 34	23 55	19	15	19 33
29 Tu	180	8	6 27 38	12 59 41	23 16	8 14 05 50	3 00	20 12	—	20	16	19 27
30 W	181	9	6 31 35	2 13 56 52	23N12	8 26 15 34	2 N 03	19S 55	0 45	20	17	3 19 23

Lunar Jyaistha (Sukladi-Sudi—Suddha or Nija) begins from June13, 24h 33m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	11 57 43	12 31	15 14	20 52	8 58	10 00	4 42	3 50	4 52	18 17	5 14	18 42
3	11 58 01	12 42	15 15	20 44	8 51	9 53	4 34	3 42	52	18	14	42
5	11 58 21	12 52	15 15	20 36	8 45	9 47	4 26	3 34	51	18	14	43
7	11 58 43	13 01	15 16	20 28	8 38	9 39	4 18	3 26	51	19	14	44
9	11 ·59 05	13 10	15 16	20 20	8 32	9 32	4 10	3 18	51	20	14	45
11	11 59 29	13 18	15 16	20 13	8 26	9 26	4 02	3 10	52	21	14	45
13	11 59 54	13 26	15 16	20 06	8 19	9 19	3 54	3 02	52	21	14	46
15	12 00 20	13 32	15 16	19 59	8 13	9 12	3 46	2 54	52	22	14	47
17	12 00 45	13 38	15 15	19 52	8 06	9 05	3 38	2 46	4 52	18 23	5 14	18 47
19	12 01 12	13 43	15 15	19 45	8 00	8 58	3 30	2 38	52	23	15	48
21	12 01 38	13 46	15 14	19 39	7 53	8 51	3 22	2 30	53	24	15	48
23	12 02 04	13 49	15 12	19 33	7 47	8 43	3 14	2 22	53	24	16	49
25	12 02 29	13 51	15 11	19 27	7 40	8 36	3 06	2 14	54	24	16	49
27	12 02 55	13 52	15 09	19 21	7 34	8 29	2 58	2 06	54	25	17	49
29	12 03 19	13 52	15 07	19 15	7 27	8 22	2 50	1 58	55	25	17	50
30	12 03 31	13 52	15 06	19 12	7 23	8 18	2 46	1 54	4 55	18 25	5 17	18 50

Sun enters : ***Mithuna*** (Sidereal) June. 15, 14*h* 38*m*. ***Trop. Cancer*** (♋): June 21, 25*h* 19*m*

Last Quarter : 7th, *9h 50m* 1st June : Pluto M.Pass. 0*h* 01*m* ***New Moon : 13th, 24h 33m***

Date	*Nirayana* Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	5 naks.	7 naks.	*14 naks.*	1 naks.	2 naks.	*22 naks.*	*22 naks.*	*17 naks.*	9/22 naks.
	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′
1	1 23 51	3 1 13	6 *R* 0 40	0 1 09	0 17 12	9*R*22 54	9*R*10 21	7*R*15 15	3 22 33
2	25 58	2 14	0 38	1 21	17 19	22 54	10 21	15 14	22 30
3	1r 28 04	n 3 15	0 37	1 33	17 26	22 53	10 20	15 12	22 27
4	2 0 08	4 16	**D** 0 36	1 45	17 33	22 53	10 19	15 11	22 24
5	2 10	5 16	0 36	1 57	17 40	22 52	10 18	15 09	22 21
6	2 4 10	3 6 16	6 0 37	0 2 09	0 17 47	9 22 51	9 10 17	7 15 07	3 22 17
7	n 6 08	7 15	0 39	2 21	17 54	22 51	10 16	15 06	22 14
8	8 03	8 14	0 42	2 32	18 00	22 50	10 15	15 04	22 11
9	9 56	9 13	0 45	2 44	18 07	22 49	10 14	15 02	22 08
10	11 47	10 11	0 49	2 55	18 14	22 48	10 13	15 01	22 05
11	2 13 35	3e 11 09	6 0 54	0 3 07	0 18 21	9 22 47	9 10 12	7 14 59	3 22 01
12	16 21	12 07	0 59	3 18	18 27	22 46	10 11	14 58	21 58
13	17 04	13 04	1 05	3 29	18 34	22 45	10 10	14 56	21 55
14	n 18 45	14 00	1 12	3 40	18 40	22 44	10 09	14 54	21 52
15	20 23	14 56	1 20	3 51	18 47	22 43	10 08	14 53	21 49
16	2 21 59	3n 15 52	6 1 28	0 4 02	0 18 53	9 22 42	9 10 07	7 14 51	3 21 46
17	23 32	16 47	1 38	4 13	18 59	22 41	10 06	14 50	21 42
18	25 02	17 42	1 47	4 24	19 06	22 40	10 05	14 48	21 39
19	26 30	18 36	1 58	4 35	19 12	22 38	10 03	14 47	21 36
20	27 55	19 29	2 09	4 45	19 18	22 37	10 02	14 45	21 33
21	2 29 17	3 20 22	6 2 21	0 4 56	0 19 24	9 22 36	9*n*10 01	7 14 44	3 21 30
22	3 0 36	21 14	2 33	5 06	19 30	22 34	10 00	14 42	21 26
23	1 53	22 06	2 46	5 16	19 36	22 33	9 58	14 41	21 23
24	n 3 07	22 57	3 00	5 26	19 42	22 31	9 57	14 39	21 20
25	4 18	23 47	3 14	5 36	19 48	22 30	9 56	14 38	21 17
26	3 5 26	3 24 37	6 3 29	0 5 46	0 19 54	9 22 28	9 9 54	7 14 36	3 21 14
27	6 32	25 26	3 44	5 56	20 00	22 27	9 53	14 35	21 11
28	e 7 34	26 14	4 00	6 05	20 06	22 25	9 52	14 34	21 07
29	8 32	27 01	4 16	6 15	20 11	22 23	9 50	14 32	21 04
30	3 9 28	3 27 47	6 4 33	0 6 24	0 20 17	9 22 22	9 9 49	7 14 31	3 21 01

Lunar Jyaistha Krishnadi (Suddha) (Asadha Vadi Nija) begins from June 28, 27h 07m .

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	1N 24	24N15	2N 36	23N41	0S 13	9S 42	1S 09	8N37	2S 12	13N03	0S 41	16S28	0N17	18S56
3	1 38	24 49	2 34	23 15	0 18	9 45	1 09	8 45	2 12	13 07	0 41	16 28	0 17	18 56
5	1 49	25 11	2 31	22 47	0 22	9 49	1 09	8 54	2 12	13 11	0 41	16 29	0 17	18 56
7	1 57	25 23	2 27	22 18	0 26	9 54	1 09	9 02	2 13	13 15	0 41	16 29	0 17	18 57
9	2 02	25 25	2 22	21 41	0 30	10 00	1 09	9 10	2 13	13 19	0 41	16 30	0 17	18 57
11	2 04	25 18	2 17	21 14	0 34	10 06	1 10	9 18	2 13	13 23	0 41	16 30	0 17	18 58
13	2 03	25 02	2 11	20 40	0 38	10 14	1 10	9 26	2 13	13 27	0 41	16 31	0 17	18 58
15	1 59	24 39	2 05	20 04	0 41	10 23	1 11	9 34	2 13	13 30	0 42	16 32	0 17	18 59
17	1 52	24 10	1 57	19 27	0 45	10 32	1 11	9 41	2 14	13 34	0 42	16 33	0 17	18 59
19	1 43	23 36	1 50	18 49	0 48	10 43	1 11	9 48	2 14	13 38	0 42	16 33	0 17	19 00
21	1 31	22 59	1 41	18 10	0 51	10 54	1 11	9 55	2 14	13 41	0 42	16 34	0 17	19 01
23	1 16	22 14	1 31	17 30	0 54	11 06	1 12	10 02	2 14	13 44	0 42	16 35	0 17	19 01
25	0 59	21 29	1 21	16 50	0 57	11 19	1 12	10 09	2 15	13 47	0 42	16 36	0 17	19 02
27	0 39	20 42	1 10	16 09	1 00	11 32	1 12	10 16	2 15	13 51	0 42	16 37	0 17	19 02
29	0 18	19 55	0 58	15 27	1 03	11 47	1 13	10 22	2 15	13 54	0 42	16 38	0 17	19 03
30	0N 06	19N31	0N 51	15N06	1S 04	11S54	1 S13	10N25	2 S15	13N55	0 S42	16S39	0N17	19S03

1st June. : Rahu Decli. 16° N 22'

1st June Pluto : Lat. 11°N 52', Decli 10°S 04'

First Quarter : 20th, 23h 43m

Full Moon : 28th, 27h 07m

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0ʰ U.T. or 5-30 a.m. I.S.T. Sun ☉ Longitude	Sun ☉ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
			h m s	6 Nakshatra s ° ' "	° '	s ° ' "	° '	° '	h m			9/22 naks s ° '
1 Th	182	10	6 35 31	2 14 59 04	23N09	9 08 33 49	0N 59	18 S40	1 34	21	17	3 19 21
2 F	183	11	6 39 28	15 51 15	23 05	9 21 02 15	0N 09	16 31	2 24	22	18	19 21
3 St	184	12	6 43 24	16 48 26	23 01	10 03 42 43	1 S 18	13 32	3 13	23	19	19 21
4 ☉	185	13	6 47 21	17 45 37	22 56	10 16 37 22	2 24	9 52	4 01	24	20	19 21
5 M	186	14	6 51 17	18 42 48	22 51	10 29 48 29	3 23	5 38	4 50	25	21	19 23
6 Tu	187	15	6 55 14	2n19 40 00	22 45	11 13 18 05	4 13	1S 03	5 38	26	22	3 19 26
7 W	188	16	6 59 10	20 37 12	22 39	11 27 07 35	4 50	3N42	6 28	27	24	19 25
8 Th	189	17	7 03 07	21 34 25	22 33	0 11 17 09	5 10	8 21	7 19	1	25	19 24
9 F	190	18	7 07 04	22 31 38	22 26	0 25 45 12	5 12	12 38	8 13	2	26	19 22
10 St	191	19	7 11 00	23 28 51	22 19	1 10 27 57	4 53	16 13	9 11	4	27	19 19
11 ☉	192	20	7 14 57	2 24 26 04	22 11	1 25 19 31	4 14	18 47	10 11	5	28	3 19 16
12 M	193	21	7 18 53	25 23 18	22 03	2 10 12 21	3 18	20 05	11 12	6	29	19 13
13 Tu	194	22	7 22 50	26 20 32	21 55	2σ24 58 20	2 09	19 59	12 14	7	30	19 11
14 W	195	23	7 26 46	27 17 47	21 47	3 09 30 00	0 S 53	18 33	13 13	8	2	19 09
15 Th	196	24	7 30 43	28 15 02	21 38	3 23 41 31	0N 25	15 59	14 09	9	3	19 08
16 F	197	25	7 34 39	2 29 12 16	21 28	4 07 29 18	1 39	12 33	15 01	10	4	3 19 10
17 St	198	26	7 38 36	3 00 09 31	21 18	4 20 52 15	2 46	8 34	15 49	11	5	19 11
18 ☉	199	27	7 42 33	01 06 46	21 08	5 03 51 16	3 42	4N19	16 35	12	6	19 12
19 M	200	28	7 46 29	02 04 01	20 58	5 16 28 55	4 26	0 S01	17 20	13	7	19 13
20 Tu	201	29	7 50 26	n 03 01 16	20 47	5 28 48 51	4 56	4 14	18 03	14	8	19 14
21 W	202	30	7 54 22	3 03 58 32	20 36	6 10 55 22	5 13	8 12	18 46	15	9	3 19 14
22 Th	203	31	7 58 19	04 55 48	20 24	6 22 52 55	5 15	11 47	19 30	16	9	19 13
23 F	204	1	8 02 15	05 53 04	20 12	7 04 45 58	5 04	14 54	20 15	17	10	19 12
24 St	205	2	8 06 12	06 50 20	20 00	7 16 38 35	4 41	17 23	21 02	17	11	19 09
25 ☉	206	3	8 10 08	07 47 37	19 48	7 28 34 28	4 04	19 09	21 50	18	12	19 08
26 M	207	4	8 14 05	3 08 44 55	19 35	8 10 36 43	3 17	20 05	22 39	19	13	3 19 07
27 Tu	208	5	8 18 02	09 42 13	19 22	8 22 47 50	2 21	20 05	23 29	20	14	19 06
28 W	209	6	8 21 58	10 39 31	19 08	9ȣ05 09 45	1 16	19 07	—	21	15	19 05
29 Th	210	7	8 25 55	11 36 50	18 54	9 17 43 47	0N 08	17 12	0 20	22	16	19 05
30 F	211	8	8 29 51	3 12 34 10	18 40	10 00 30 50	1 S 03	14 24	1 10	23	17	3 19 05
31 St	212	9	8 33 48	3 13 31 30	18N26	10 13 31 23	2 S 11	10 S50	1 59	24	18	3 19 05

Lunar Asadha (Sukladi-Sudi) begins from July 13, 7h 54m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T.	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T.
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	12 03 43	13 51	15 05	19 10	7 20	8 15	2 42	1 50	4 56	18 25	5 18	18 50
3	12 04 06	13 49	15 04	19 04	7 14	8 08	2 33	1 42	56	25	18	50
5	12 04 27	13 46	15 00	18 58	7 07	8 01	2 25	1 34	57	25	19	50
7	12 04 48	13 42	14 57	18 53	7 00	7 53	2 17	1 26	58	25	20	50
9	12 05 07	13 36	14 53	18 48	6 53	7 46	2 09	1 18	58	25	21	50
11	12 05 24	13 29	14 49	18 43	6 46	7 39	2 01	1 09	59	25	22	50
13	12 05 40	13 21	14 45	18 38	6 40	7 32	1 53	1 01	5 00	24	22	49
15	12 05 54	13 12	14 41	18 33	6 33	7 24	1 45	0 53	01	24	23	49
17	12 06 05	13 02	14 36	18 28	6 26	7 17	1 37	0 45	5 02	18 23	5 24	18 48
19	12 06 15	12 50	14 30	18 24	6 19	7 10	1 28	0 37	03	23	25	48
21	12 06 22	12 38	14 24	18 19	6 12	7 03	1 20	0 29	03	22	26	47
23	12 06 27	12 25	14 18	18 15	6 05	6 55	1 12	0 21	04	22	27	46
25	12 06 30	12 11	14 11	18 11	5 58	6 48	1 04	0 13	05	21	28	45
27	12 06 30	11 58	14 04	18 06	5 50	6 40	0 56	0 05	06	20	28	44
29	12 06 28	11 45	13 56	18 02	5 43	6 33	0 48	23 53	07	19	29	44
31	12 06 24	11 32	13 47	17 58	5 36	6 26	0 39	23 45	5 08	18 18	5 30	18 42

Sun enters : ***Karkata*** (Sidereal) July 16, 25*h* 31*m* ***Trop. Leo*** (♌) : July. 23, 12*h* 14*m*

Last Quarter : 6th, 17*h* 27*m* 1st July : Pluto M. Pass. 21*h* 56*m* ***New Moon* : 13th, 7*h* 54*m***

Date	*Nirayana* Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	8 naks.	9 naks.	14 naks.	1 naks.	2 naks.	*22 naks.*	*21 naks.*	*17 naks.*	9/22 naks.
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
1	3 10 20	3 28 33	6 4 51	0 6 34	0 20 22	9*R*22 20	9 *R*9 47	7*R*14 29	3 20 58
2	11 09	3n29 18	5 09	6 43	20 28	22 18	9 46	14 28	20 55
3	11 54	4 0 01	5 27	6 52	20 33	22 17	9 45	14 27	20 52
4	12 35	0 44	5 46	7 01	20 39	22 15	9 43	14 25	20 48
5	13 12	1 26	6 06	7 10	20 44	22 13	9 42	14 24	20 45
6	3 13 46	4 2 07	6 n 6 26	0 7 18	0 20 49	9 22 11	9 9 40	7 14 23	3 20 42
7	14 15	2 47	6 46	7 27	20 54	22 09	9 39	14 22	20 39
8	14 40	3 25	7 07	7 35	20 59	22 07	9 37	14 20	20 36
9	15 01	4 03	7 29	7 43	21 04	22 05	9 35	14 19	20 32
10	15 18	4 39	7 51	7 51	21 09	22 03	9 34	14 18	20 29
11	3 15 29	4 5 14	6 8 13	0 7 59	0 21 14	9 22 01	9 9 32	7 14 17	3 20 26
12	**R** 15 36	5 48	8 36	8 07	21 19	21 59	9 31	14 16	20 23
13	15 39	6 21	8 59	8 15	21 23	21 57	9 29	14 15	20 20
14	15 36	6 52	9 23	8 23	21 28	21 55	9 28	14 14	20 17
15	*s* 15 29	7 22	9 47	8 30	21 32	21 53	9 26	14 13	20 13
16	3 15 17	4 7 50	6 10 11	0 8 37	0 21 37	9 21 51	9 9 25	7 14 12	3 20 10
17	15 00	8 17	10 36	8 44	21 41	21 49	9 23	14 11	20 07
18	14 39	8 42	11 01	8 51	21 45	21 46	9 21	14 10	20 04
19	14 14	9 05	11 27	8 58	21 50	21 44	9 20	14 09	20 01
20	13 44	9 27	11 53	9 05	21 54	21 42	9 18	14 08	19 57
21	3 13 11	4 9 47	6 12 19	0 9 11	0 21 58	9 21 40	9 9 16	7 14 07	3 19 54
22	12 35	10 05	12 46	9 18	22 02	21 38	9 15	14 06	19 51
23	11 56	10 22	13 13	9 24	22 05	21 35	9 13	14 05	19 48
24	11 16	10 36	13 40	9 30	22 09	21 33	9 12	14 04	19 45
25	10 34	10 48	14 08	9 36	22 13	21 31	9 10	14 03	19 42
26	3♂9 51	4 10 58	6 14 36	0 9 41	0 22 16	9 21 28	9ℰ9 08	7 14 03	3 19 38
27	9 08	11 06	15 04	9 47	22 20	21 26	9 07	14 02	19 35
28	8 26	11 12	15 33	9 52	22 23	21 24	9 05	14 01	19 32
29	7 46	11 16	16 02	9 57	22 27	21 21	9 03	14 01	19 29
30	7 08	**R** 11 17	16 31	10 02	22 30	21 19	9 02	14 00	19 26
31	3 6 34	4 11 16	6 17 01	0 10 07	0 22 33	9 21 17	9 9 00	7 13 59	3 19 22

Lunar Asadha Krishnadi (Sravana-Vadi) begins from July 28, 16h 55m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '
1	0S 06	19N07	0N45	14N45	1 S05	12S01	1 S13	10N28	2 S16	13N57	0 S42	16S39	0N17	19S04
3	0 32	18 19	0 31	14 03	1 08	12 17	1 13	10 34	2 16	14 00	0 42	16 40	0 17	19 04
5	0 59	17 34	0 16	13 21	1 10	12 33	1 14	10 40	2 16	14 02	0 42	16 41	0 17	19 05
7	1 27	16 50	0N00	12 37	1 12	12 49	1 14	10 46	2 17	14 05	0 42	16 43	0 17	19 06
9	1 57	16 10	0 S16	11 57	1 15	13 06	1 15	10 51	2 17	14 08	0 42	16 44	0 17	19 07
11	2 26	15 34	0 34	11 15	1 17	13 23	1 15	10 56	2 17	14 10	0 42	16 45	0 17	19 07
13	2 56	15 03	0 53	10 15	1 19	13 41	1 15	11 01	2· 18	14 12	0 42	16 46	0 17	19 08
15	3 24	14 38	1 13	9 55	1 21	13 59	1 16	11 06	2 18	14 15	0 42	16 48	0 17	19 09
17	3 51	14 20	1 33	9 16	1 23	14 18	1 16	11 11	2 18	14 17	0 42	16 49	0 17	19 10
19	4 15	14 09	1 55	8 38	1 24	14 37	1 17	11 15	2 19	14 19	0 42	16 50	0 17	19 10
21	4 34	14 05	2 18	8 02	1 26	14 56	1 17	11 19	2 19	14 21	0 42	16 52	0 17	19 11
23	4 49	14 09	2 41	7 28	1 28	15 15	1 18	11 23	2 20	14 23	0 42	16 53	0 17	19 12
25	4 57	14 21	3 06	6 55	1 29	15 34	1 18	11 26	2 · 20	14 24	0 43	16 54	0 17	19 13
27	4 58	14 39	3 31	6 25	1 31	15 54	1 18	11 30	2 20	14 26	0 43	16 56	0 17	19 13
29	4 52	15 03	3 57	5 57	1 32	16 14	1 19	11 33	2 21	14 27	0 43	16 57	0 17	19 14
31	4 S40	15N30	4 S23	5N33	1 S34	16S34	1 S19	11N36	2 S21	14N30	0 S43	16S59	0N17	19S15

1st July : Rahu Decli. 16°N 53'

1st July Pluto : Lat. 11°N 47', Decli 10°S 3'

First Quarter : 20th, 14*h* 30*m*

Full Moon : 28th, 16h 55m

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0h U.T. or 5-30 a.m. I.S.T. Sun ☉ Longitude	Sun ☉ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
				8 Nakshatra								9/22 naks
			h m s	s ° ′ ″	° ′	s ° ′ ″	° ′	° ′	h m			s ° ′
1 ☉	213	10	8 37 44	3 14 28 52	18N11	10 26 45 37	3 S 14	6 S42	2 48	25	19	3 19 06
2 M	214	11	8 41 41	15 26 15	17 56	11 10 13 32	4 07	2 S10	3 36	26	20	19 06
3 Tu	215	12	8 45 37	n 16 23 39	17 40	11 23 54 52	4 47	2N32	4 25	27	21	19 06
4 W	216	13	8 49 34	17 21 04	17 25	0 07 49 02	5 11	7 11	5 15	1	22	19 06
5 Th	217	14	8 53 31	18 18 29	17 09	0 21 54 56	5 17	11 30	6 07	2	23	19 06
6 F	218	15	8 57 27	3 19 15 57	16 53	1 06 10 52	5 03	15 13	7 02	3	24	3 19 06
7 St	219	16	9 01 24	20 13 26	16 36	1 20 34 10	4 31	18 03	7 59	4	26	19 06
8 ☉	220	17	9 05 20	21 10 56	16 20	2 05 01 19	3 41	19 45	8 58	5	27	19 06
9 M	221	18	9 09 17	22 08 27	16 03	2 19 27 55	2 37	20 10	9 58	6	28	19 07
10 Tu	222	19	9 13 13	23 06 00	15 45	3 03 49 08	1 24	19 15	10 57	8	29	19 07
11 W	223	20	9 17 10	3 24 03 34	15 28	3☌18 00 01	0 S 06	17 08	11 54	9	30	3 19 07
12 Th	224	21	9 21 06	25 01 09	15 10	4 01 56 13	1 N 10	14 02	12 48	10	1	19 07
13 F	225	22	9 25 03	25 58 45	14 52	4 15 34 20	2 21	10 13	13 39	11	2	19 07
14 S	226	23	9 29 0	26 56 22	14 34	4 28 52 28	3 23	6 00	14 27	12	3	19 06
15 ☉	227	24	9 32 56	27 54 00	14 15	5 11 50 10	4 12	1N36	15 12	13	4	19 05
16 M	228	25	9 36 53	3 28 51 39	13 57	5 24 28 31	4 48	2 S44	15 57	14	5	3 19 04
17 Tu	229	26	9 40 49	3n29 49 19	13 38	6 06 49 53	5 09	6 52	16 41	15	6	19 02
18 W	230	27	9 44 46	4 00 47 00	13 19	6 18 57 39	5 16	10 39	17 25	15	7	19 02
19 Th	231	28	9 48 42	01 44 42	12 59	7 00 55 55	5 10	13 57	18 09	16	8	19 01
20 F	232	29	9 52 39	02 42 26	12 40	7 12 49 13	4 50	16 40	18 55	17	9	19 02
21 St	233	30	9 56 35	4 03 40 11	12 20	7 24 42 12	4 17	18 40	19 43	18	10	3 19 02
22 ☉	234	31	10 00 32	04 37 56	12 00	8 06 39 25	3 34	19 53	20 31	19	11	19 03
23 M	235	1	10 04 29	05 35 43	11 40	8 18 45 08	2 40	20 11	21 21	20	12	19 05
24 Tu	236	2	10 08 25	06 33 31	11 20	9 01 03 01	1 38	19 32	22 12	21	13	19 06
25 W	237	3	10 12 22	07 31 20	10 59	9 13 35 55	0 N 30	17 55	23 02	22	14	19 07
26 Th	238	4	10 16 18	4 08 29 11	10 39	9☍26 25 45	0 S 40	15 22	23 52	23	14	3 19 07
27 F	239	5	10 20 15	09 27 03	10 18	10 09 33 16	1 50	11 58	—	24	16	19 06
28 St	240	6	10 24 11	10 24 57	9 57	10 22 57 59	2 56	7 54	0 42	25	17	19 04
29 ☉	241	7	10 28 08	11 22 52	9 36	11 06 38 15	3 52	3S 22	1 32	26	18	19 01
30 M	242	8	10 32 04	4 12 20 49	9 14	11 20 31 30	4 36	1N25	2 22	27	19	18 58
31 Tu	243	9	10 36 01	4n13 18 47	8N53	0 04 34 31	5 S 04	6N10	3 12	1	20	3 18 55

Lunar Sravana (Sukladi-Sudi) begins from August 11, 16h 39m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	12 06 21	11 26	13 43	17 56	5 32	6 22	0 35	23 41	5 08	18 17	5 31	18 42
3	12 06 13	11 16	13 33	17 52	5 25	6 14	0 27	23 32	09	16	31	41
5	12 06 02	11 07	13 23	17 48	5 18	6 07	0 19	23 24	10	15	32	40
7	12 05 49	11 00	13 13	17 45	5 10	6 00	0 11	23 16	10	14	33	38
9	12 05 34	10 54	13 01	17 41	5 03	5 52	0 03	23 08	11	13	34	37
11	12 05 17	10 50	12 50	17 38	4 55	5 44	23 50	23 00	12	11	35	36
13	12 04 57	10 48	12 38	17 34	4 48	5 37	23 42	22 52	13	10	35	34
15	12 04 35	10 48	12 26	17 31	4 40	5 29	23 34	22 44	13	08	36	33
17	12 04 11	10 50	12 13	17 27	4 33	5 21	23 26	22 36	5 14	18 07	5 37	18 31
19	12 03 45	10 53	12 00	17 24	4 25	5 14	23 18	22 28	15	05	38	29
21	12 03 17	10 58	11 48	17 21	4 17	5 06	23 09	22 20	15	04	38	28
23	12 02 47	11 04	11 35	17 18	4 10	4 58	23 01	22 12	16	02	39	26
25	12 02 15	11 10	11 23	17 15	4 02	4 50	22 53	22 04	17	18 00	40	24
27	12 01 41	11 17	11 11	17 12	3 54	4 43	22 45	21 56	18	17 58	41	22
29	12 01 06	11 24	10 59	17 10	3 46	4 35	22 37	21 48	18	17 57	41	21
31	12 00 30	11 32	10 48	17 07	3 38	4 27	22 29	21 40	5 19	17 55	5 42	18 19

Sun enters : ***Simha*** (Sidereal) Aug. 17, 9*h* 57*m* ***Trop. Virgo*** (♍) *:* Aug. 23, 19*h* 21*m*

Last Quarter : 4th, 22*h* 57*m* 1st Aug. : Pluto M. Pass. 19*h* 52*m* ***New Moon :*** **11th, 16*h* 39*m***

Date	*Nirayana* Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	8 naks.	*10 naks.*	15 naks.	1 naks.	2 naks.	*22 naks.*	*21 naks.*	*17 naks.*	9/22 naks.
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
1	3*R*6 03	4*R*11 13	6 17 31	0 10 12	0 22 36	9*R*21 14	9*R*8 59	7*R*13 59	3 19 19
2	5 36	11 07	18 01	10 16	22 39	21 12	8 57	13 58	19 16
3	r 5 15	10 59	18 31	10 21	22 42	21 10	8 55	13 58	19 13
4	4 59	10 48	19 02	10 25	22 44	21 07	8 54	13 57	19 10
5	4 48	10 36	n 19 33	10 29	22 47	21 05	8 52	13 57	19 07
6	3 **D**4 44	4 10 20	6 20 04	0 10 33	0 22 50	9 21 02	9 8 51	7 13 56	3 19 03
7	4 47	10 03	20 36	10 36	22 52	*8* 21 00	8 49	13 56	19 00
8	4 56	9 43	21 08	10 40	22 54	20 58	8 47	13 55	18 57
9	5 11	9 21	21 40	10 43	22 57	20 55	8 46	13 55	18 54
10	5 34	s 8 57	22 12	10 46	22 59	20 53	8 44	13 55	18 51
11	3 6 03	4 8 31	6 22 45	0 10 49	0 23 01	9 20 50	9 8 43	7 13 54	3 18 48
12	6 39	8 03	23 18	10 51	23 03	20 48	8 41	13 54	18 44
13	7 22	7 33	23 51	10 54	23 05	20 46	8 40	13 54	18 41
14	e 8 12	7 02	24 24	10 56	23 06	20 43	8 38	13 54	18 38
15	9 08	6 29	24 58	10 58	23 08	20 41	8 36	13 54	18 35
16	3 10 10	4 5 55	6 25 31	0 11 00	0 23 09	9 20 38	9 8 35	7 13 53	3 18 32
17	11 19	5 20	26 06	11 02	23 11	20 36	8 33	13 53	18 28
18	12 33	4 44	26 40	11 03	23 12	20 34	8 32	13 53	18 25
19	13 53	4 07	27 14	11 05	23 13	20 31	8 30	**D** 13 53	18 22
20	n 15 19	♂ 3 30	27 49	11 06	23 15	20 29	8 29	13 53	18 19
21	3 16 49	4 2 52	6 28 24	0 11 07	0 23 16	9 20 27	9 8 28	7 13 53	3 18 16
22	18 24	2 15	28 59	11 07	23 16	20 24	8 26	13 53	18 13
23	20 03	1 38	6 29 35	11 08	23 17	20 22	8 25	13 54	18 09
24	21 46	r 1 02	7 0 10	11 08	23 18	20 20	8 23	13 54	18 06
25	23 32	4 *n*0 26	0 46	**R** 11 08	23 19	20 18	8 22	13 54	18 03
26	3 25 21	3 29 52	7 1 22	0 11 08	0 23 19	9 20 15	9 8 21	7 13 54	3 18 00
27	27 13	29 18	1 58	11 08	23 19	20 13	8 19	13 54	17 57
28	3n29 06	28 46	2 34	11 07	23 20	20 11	8 18	13 55	17 53
29	4 s 1 01	28 16	n 3 11	11 07	23 20	20 09	8 17	13 55	17 50
30	2 57	27 47	3 47	11 06	**R** 23 20	20 07	8 15	13 55	17 47
31	4 4 54	3 27 21	7 4 24	0 11 05	0 23 20	9 20 04	9 8 14	7 13 56	3 17 44

Lunar Sravana Krishnadi (Bhadrapada-Vadi) begins from August 26, 29h 18m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '
1	4S 31	15N45	4 S37	5 N21	1S 34	16S44	1 S20	11N37	2 S22	14N30	0 S43	16S59	0N17	19S15
3	4 09	16 16	5 04	5 01	1 35	17 04	1 20	11 40	2 22	14 31	0 43	17 01	0 17	19 16
5	3 43	16 47	5 30	4 45	1 37	17 24	1 20	11 42	2 22	14 32	0 43	17 02	0 17	19 17
7	3 14	17 16	5 56	4 32	1 38	17 44	1 21	11 44	2 23	14 33	0 43	17 04	0 17	19 18
9	2 42	17 43	6 21	4 24	1 39	18 04	1 21	11 46	2 23	14 34	0 43	17 05	0 17	19 18
11	2 08	18 05	6 45	4 19	1 40	18 23	1 22	11 47	2 24	14 34	0 43	17 06	0 17	19 19
13	1 35	18 21	7 07	4 19	1 41	18 43	1 22	11 49	2 24	14 35	0 43	17 08	0 17	19 20
15	1 02	18 29	7 27	4 22	1 42	19 03	1 23	11 50	2 25	14 35	0 43	17 09	0 17	19 20
17	0 31	18 28	7 44	4 30	1 43	19 22	1 23	11 50	2 25	14 36	0 43	17 11	0 17	19 21
19	0S 02	18 18	7 58	4 41	1 43	19 41	1 24	11 51	2 26	14 36	0 43	17 12	0 17	19 22
21	0 N24	17 57	8 09	4 56	1 44	20 00	1 24	11 51	2 26	14 36	0 43	17 13	0 16	19 23
23	0 47	17 24	8 16	5 13	1 45	20 19	1 25	11 51	2 27	14 36	0 43	17 15	0 16	19 24
25	1 06	16 40	8 20	5 33	1 46	20 38	1 25	11 51	2 27	14 36	0 43	17 16	0 16	19 25
27	1 21	15 46	8 20	5 55	1 46	20 56	1 26	11 50	2 28	14 36	0 43	17 17	0 16	19 25
29	1 33	14 42	8 17	6 18	1 47	21 13	1 26	11 49	2 28	14 36	0 43	17 18	0 16	19 25
31	1 N41	13N29	8 S10	6 N41	1S 47	21S31	1 S26	11N48	2 S28	14N35	0 S43	17S20	0N16	19S26

1st Aug. : Rahu Decli. 16°N 57'

1st Aug. Pluto : Lat. 11°N 35', Decli. 10°S 10'

First Quarter : 19th, 7*h* 17*m*

Full Moon : 26th, 29h 18m

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0ʰ U.T. or 5-30 a.m. I.S.T. Sun ⊙ Longitude	Sun ⊙ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
			h m s	11 Nakshatra s ° ′ ″	° ′	s ° ′ ″	° ′	° ′	h m			9/22 naks s ° ′
1 W	244	10	10 39 58	4 14 16 47	8 N 31	0 18 43 57	5 S 14	10N37	4 04	2	21	3 18 52
2 Th	245	11	10 43 54	15 14 49	8 10	1 02 56 34	5 04	14 30	4 58	3	22	18 51
3 F	246	12	10 47 51	16 12 54	7 48	1 17 09 32	4 36	17 32	5 53	4	23	18 50
4 St	247	13	10 51 47	17 11 01	7 26	2 01 20 33	3 52	19 30	6 51	5	24	18 51
5 ☉	248	14	10 55 44	18 09 10	7 04	2 15 27 38	2 53	20 14	7 49	6	25	18 52
6 M	249	15	10 59 40	4 19 07 20	6 41	2 29 29 02	1 44	19 42	8 47	7	26	3 18 54
7 Tu	250	16	11 03 37	20 05 33	6 19	3 13 22 58	0 S 30	17 59	9 44	8	27	18 55
8 W	251	17	11 07 33	21 03 48	5 57	3 27 07 30	0 N 45	15 13	10 38	9	29	18 54
9 Th	252	18	11 11 30	22 02 04	5 34	4☌10 40 37	1 56	11 39	11 29	10	30	18 53
10 F	253	19	11 15 27	23 00 22	5 11	4 24 00 25	3 00	7 34	12 18	11	1	18 49
11 St	254	20	11 19 23	4 23 58 41	4 49	5 07 05 18	3 52	3N11	13 04	12	2	3 18 44
12 ☉	255	21	11 23 20	24 57 02	4 26	5 19 54 26	4 32	1 S14	13 50	13	3	18 38
13 M	256	22	11 27 16	n 25 55 25	4 03	6 02 27 51	4 58	5 31	14 34	14	4	18 32
14 Tu	257	23	11 31 13	26 53 50	3 40	6 14 46 40	5 09	9 29	15 18	15	4	18 26
15 W	258	24	11 35 09	27 52 17	3 17	6 26 53 07	5 07	13 00	16 03	16	5	18 20
16 Th	259	25	11 39 06	4 28 50 45	2 54	7 08 50 24	4 50	15 57	16 49	17	6	3 18 17
17 F	260	26	11 43 02	4 29 49 15	2 31	7 20 42 33	4 22	18 12	17 35	18	7	18 14
18 St	261	27	11 46 59	5 00 47 47	2 08	8 02 34 10	3 42	19 41	18 23	19	8	18 14
19 ☉	262	28	11 50 56	01 46 21	1 44	8 14 30 16	2 53	20 18	19 12	20	9	18 14
20 M	263	29	11 54 52	02 44 56	1 21	8 26 35 54	1 55	20 00	20 02	20	10	18 16
21 Tu	264	30	11 58 49	5 03. 43 33	0 58	9 08 55 54	0 N 50	18 43	20 52	21	11	3 18 17
22 W	265	31	12 02 45	04 42 11	0 35	9 21 34 28	0 S 18	16 30	21 42	22	12	18 17
23 Th	266	1	12 06 42	05 40 51	0 N 11	10 04 34 42	1 27	13 23	22 32	23	13	18 16
24 F	267	2	12 10 38	06 39 32	0 S 12	10 17 58 08	2 33	9 29	23 23	24	14	18 13
25 St	268	3	12 14 35	07 38 15	0 35	11☍01 44 23	3 32	5 00	—	25	15	18 07
26 ☉	269	4	12 18 31	5 08 37 01	0 59	11 15 50 44	4 20	0 S09	0 13	26	16	3 18 00
27 M	270	5	12 22 28	n 09 35 49	1 22	0 00 12 29	4 52	4N48	1 05	1	17	17 52
28 Tu	271	6	12 26 25	10 34 39	1 46	0 14 43 27	5 05	9 32	1 57	2	18	17 44
29 W	272	·7	12 30 21	11 33 31	2 09	0 29 16 58	5 00	13 43	2 52	3	19	17 36
30 Th	273	8	12 34 18	5 12 32 25	2 S 32	1 13 46 52	4 S 35	17N04	3 47	4	21	3 17 31

Lunar Bhadrapada (Sukladi-Sudi) begins from September 9, 27h 32m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	12 00 11	11 35	10 43	17 05	3 34	4 23	22 25	21 36	5 19	17 54	5 42	18 18
3	11 59 32	11 43	10 32	17 03	3 26	4 15	22 16	21 28	20	52	43	16
5	11 58 53	11 50	10 23	17 00	3 18	4 07	22 08	21 20	20	50	43	14
7	11 58 13	11 56	10 14	16 57	3 09	3 59	22 00	21 11	21	48	44	12
9	11 57 32	12 02	10 05	16 55	3 01	3 51	21 52	21 03	22	46	45	10
11	11 56 50	12 08	9 57	16 52	2 53	3 43	21 44	20 55	22	44	45	08
13	11 56 08	12 13	9 50	16 50	2 45	3 35	21 36	20 47	23	42	46	06
15	11 55 26	12 18	9 44	16 48	2 37	3 27	21 28	20 39	23	40	47	04
17	11 54 43	12 23	9 38	16 46	2 28	3 19	21 20	20 31	5 24	17 38	5 47	18 02
19	11 54 00	12 28	9 32	16 44	2 20	3 11	21 12	20 24	24	36	48	18 00
21	11 53 18	12 32	9 27	16 42	2 11	3 03	21 04	20 16	25	34	48	17 58
23	11 52 35	12 36	9 23	16 40	2 03	2 55	20 56	20 08	26	32	49	56
25	11 51 53	12 40	9 19	16 38	1 54	2 46	20 47	20 00	26	30	50	54
27	11 51 12	12 43	9 15	16 36	1 46	2 38	20 39	19 52	27	28	50	52
29	11 50 31	12 47	9 12	16 34	1 37	2 29	20 31	19 44	27	26	51	50
30	11 50 11	12 49	9 10	16 33	1 33	2 26	20 27	19 40	5 27	17 25	5 51	17 49

Sun enters : Kanya (Sidereal) Sept. 17, 9*h* 54*m*. ***Trop. Libra*** (♎) : Sept. 23, 17*h* 01*m*

Last Quarter : 2nd, 27*h* 47*m* 1st Sept. : Pluto M. Pass. 17*h* 50*m* ***New Moon : 9th, 27h 32m***

Date	*Nirayana* Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	10 naks.	*9 naks.*	17 naks.	*1 naks.*	*2 naks.*	*22 naks.*	*21 naks.*	17 naks.	9/22 naks.
	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′
1	4 6 52	3*R*26 56	7 5 01	0*R*11 04	0*R*23 20	9*R*20 02	9 *R*8 13	7 13 56	3 17 41
2	8 50	26 33	5 39	11 02	23 19	20 00	8 12	13 56	17 38
3	10 47	26 13	6 16	11 00	23 19	19 58	8 10	13 57	17 34
4	n 12 45	25 55	6 54	10 59	23 19	19 56	8 09	13 57	17 31
5	14 42	25 40	7 31	10 56	23 18	19 54	8 08	13 58	17 28
6	4 16 38	3 25 26	7 8 09	0 10 54	0 23 17	9 19 52	9 8 07	7 13 59	3 17 25
7	18 34	25 16	8 48	10 52	23 17	19 50	8 06	13 59	17 22
8	♂ 20 29	25 07	9 26	10 49	23 16	19 48	8 05	14 00	17 18
9	22 23	25 01	10 04	10 46	23 15	19 46	8 04	14 01	17 15
10	24 16	24 58	10 43	10 43	23 14	19 44	8 03	14 01	17 12
11	4n26 08	3**D**24 56	7 11 22	0 10 40	0 23 12	9 19 43	9 8 02	7 14 02	3 17 09
12	27 59	24 57	12 01	10 36	23 11	19 41	8 01	14 03	17 06
13	4 29 49	25 01	12 40	10 33	23 10	19 39	8 00	14 04	17 03
14	5 1 38	25 07	13 19	10 29	23 08	19 37	7 59	14 04	16 59
15	3 26	25 14	13 58	10 25	23 06	19 35	7 58	14 05	16 56
16	5 5 12	3 25 25	7 14 38	0 10 21	0 23 05	9 19 34	9 7 57	7 14 06	3 16 53
17	6 58	25 37	15 18	10 16	23 03	19 32	7 56	14 07	16 50
18	n 8 42	25 51	15 57	10 12	23 01	19 30	7 55	14 08	16 47
19	10 26	26 07	n 16 37	10 07	22 59	19 29	7 54	14 09	16 44
20	12 08	26 25	17 17	10 02	22 57	19 27	7 54	14 10	*n/* 16 40
21	5 13 50	3 26 45	7 17 58	0 9 57	0 22 55	9 19 26	9 7 53	7 14 11	3 16 37
22	15 30	27 07	18 38	9 52	22 52	19 24	7 52	14 12	16 34
23	17 09	27 31	19 19	9 47	22 50	19 23	7 52	14 13	16 31
24	18 48	27 56	19 59	9 41	22 47	19 22	7 51	14 14	16 28
25	20 25	28 23	20 40	9 35	22 45	19 20	7 50	14 16	16 24
26	5n22 02	3 28 52	7 21 21	0 9 30	0 22 42	9 19 19	9 7 50	7 14 17	3 16 21
27	r 23 37	29 22	22 02	9 24	22 39	19 18	7 49	14 18	16 18
28	25 12	3n29 54	22 43	9 18	22 36	19 16	7 49	14 19	16 15
29	26 46	4 0 27	23 24	9 11	22 33	19 15	7 48	14 21	16 12
30	5 28 19	4 1 02	7 24 06	0 9 05	0 22 30	9 19 14	9 7 48	7 14 22	3 16 09

Lunar Bhadrapada Krishnadi (Asvina Vadi) begins from September 25, 16h 21m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	1N 44	!2N50	8 S06	6N53	1 S47	21S39	1 S27	11N48	2 S29	14N35	0 S43	17S20	0N16	19S26
3	1 47	11 28	7 55	7 17	1 48	21 56	1 27	11 46	2 29	14 34	0 43	17 21	0 16	19 27
5	1 47	10 01	7 42	7 38	1 48	22 12	1 28	11 45	2 30	14 34	0 43	17 23	0 16	19 27
7	1 44	8 30	7 28	8 00	1 49	22 28	1 28	11 43	2 30	14 33	0 42	17 24	0 16	19 28
9	1 39	6 57	7 11	8 19	1 49	22 43	1 28	11 40	2 30	14 32	0 42	17 25	0 16	19 28
11	1 32	5 23	6 54	8 38	1 49	22 57	1 29	11 38	2 31	14 31	0 42	17 26	0 16	19 29
13	1 24	3 48	6 35	8 54	1 49	23 11	1 29	11 35	2 31	14 30	0 42	17 27	0 16	19 29
15	1 14	2 13	6 16	9 08	1 49	23 25	1 30	11 32	2 32	14 28	0 42	17 28	0 16	19 30
17	1 03	0N38	5 56	9 20	1 49	23 37	1 30	11 29	2 32	14 27	0 42	17 29	0 16	19 30
19	0 51	0 S56	5 36	9 30	1 50	23 49	1 30	11 26	2 33	14 26	2 42	17 30	0 16	19 30
21	0 38	2 28	5 16	9 38	1 50	24 01	1 31	11 22	2 33	14 24	0 42	17 30	0 16	19 31
23	0 24	3 59	4 56	9 42	1 50	24 11	1 31	11 18	2 33	14 22	0 42	17 31	0 16	19 31
25	0 10	5 28	4 35	9 45	1 49	24 21	1 31	11 14	2 34	14 20	0 42	17 32	0 16	19 31
27	0 N04	6 55	4 16	9 45	1 49	24 30	1 31	11 10	2 34	14 19	0 42	17 33	0 16	19 32
29	0 S18	8 20	3 56	9 43	1 49	24 38	1 32	11 05	2 34	14 17	0 42	17 33	0 16	19 32
30	0 S26	9 S01	3 S46	9N40	1 S49	24S42	1 S32	11N03	2 S35	14N16	0 S42	17S34	0N16	19S32

1st Sept. : Rahu Decli. 17° N 01'

First Quarter : 17th, 25*h* 36*m*

1st Sept. Pluto : Lat. 11°N 21', Decli 10°S 24'

Full Moon : 25th, 16h 21m

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0ʰ U.T. or 5-30 a.m. I.S.T. Sun ☉ Longitude	Sun ☉ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
				13 Nakshatra								9/22 naks
			h m s	s ° ' "	° '	s ° ' "	° '	° '	h m			s ° '
1 F	274	9	12 38 14	5 13 31 22	2 S56	1 28 08 26	3 S 53	19N20	4 46	5	22	3 17 28
2 St	275	10	12 42 11	14 30 21	3 19	2 12 18 37	2 57	20 21	5 45	6	23	17 27
3 ☀	276	11	12 46 07	15 29 22	3 42	2 26 16 04	1 51	20 06	6 42	7	24	17 27
4 M	277	12	12 50 04	16 28 26	4 05	3 10 00 38	0 S 40	18 39	7 39	8	25	17 28
5 Tu	278	13	12 54 00	17 27 32	4 28	3 23 32 49	0 N 32	16 08	8 33	9	26	17 28
6 W	279	14	12 57 57	5 18 26 39	4 51	4 06 53 18	1 42	12 48	9 23	10	27	3 17 26
7 Th	280	15	13 01 54	19 25 50	5 15	4 20 02 32	2 44	8 52	10 12	11	28	17 22
8 F	281	16	13 05 50	20 25 03	5 38	5 03 00 35	3 38	4 35	10 58	12	29	17 15
9 St	282	17	13 09 47	21 24 17	6 00	5☌15 47 16	4 19	0N09	11 44	13	30	17 06
10 ☀	283	18	13 13 43	n 22 23 34	6 23	5 28 22 19	4 47	4 S13	12 28	14	1	16 54
11 M	284	19	13 17 40	5 23 22 53	6 46	6 10 45 40	5 00	8 20	13 12	15	2	n/3 16 42
12 Tu	285	20	13 21 36	24 22 14	7 09	6 22 57 48	5 00	12 03	13 57	16	3	16 29
13 W	286	21	13 25 33	25 21 37	7 31	7 05 00 00	4 46	15 14	14 42	17	4	16 18
14 Th	287	22	13 29 29	26 21 02	7 54	7 16 54 26	4 20	17 46	15 29	18	5	16 10
15 F	288	23	13 33 26	26 24 29	8 16	7 28 44 14	3 43	19 31	16 16	18	6	16 03
16 St	289	24	13 37 22	5 28 19 57	8 38	8 10 33 23	2 56	20 26	17 04	19	7	3 16 00
17 ☀	290	25	13 41 19	5 29 19 27	9 00	8 22 26 35	2 01	20 26	17 53	20	7	15 58
18 M	291	26	13 45 16	6 00 18 58	9 22	9 04 29 06	1 N 01	19 30	18 42	21	8	15 58
19 Tu	292	27	13 49 12	01 18 32	9 44	9 16 46 22	0 S 04	17 39	19 31	22	9	15 58
20 W	293	28	13 53 09	02 18 07	10 06	9 29 23 36	1 11	14 53	20 21	23	10	15 57
21 Th	294	29	13 57 05	6 03 17 44	10 27	10 12 25 17	2 15	11 18	21 10	24	11	3 15 55
22 F	295	30	14 01 02	04 17 23	10 49	10 25 54 23	3 15	7 02	21 50	25	12	15 50
23 St	296	1	14 04 58	05 17 04	11 10	11 09 51 41	4 04	2 S16	22 51	26	13	15 42
24 ☀	297	2	14 08 55	n 06 16 46	11 31	11☍24 15 01	4 40	2N46	23 44	27	14	15 32
25 M	298	3	14 12 51	07 16 31	11 52	0 08 59 00	4 59	7 46	—	1	16	15 20
26 Tu	299	4	14 16 48	6 08 16 17	12 13	0 23 55 38	4 57	12 22	0 39	2	17	3 15 09
27 W	300	5	14 20 45	09 16 05	12 33	1 08 55 23	4 35	16 13	1 37	3	18	14 58
28 Th	301	6	14 24 41	10 15 55	12 53	1 23 48 58	3 54	18 59	2 36	5	19	14 50
29 F	302	7	14 28 38	11 15 48	13 14	2 08 28 53	2 59	20 26	3 37	6	20	14 44
30 St	303	8	14 32 34	6 12 15 44	13 33	2 22 50 17	1 53	20 32	4 37	7	21	14 41
31 ☀	304	9	14 36 31	6 13 15 41	13 S53	3 06 51 05	0 S 41	19N20	5 35	8	22	3 14 40

Lunar Asvina (Sukladi-Sudi) begins from October 9, 17h 04m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	11 49 51	12 50	9 09	16 32	1 28	2 22	20 23	19 36	5 28	17 24	5 52	17 48
3	11 49 13	12 53	9 06	16 31	1 20	2 13	20 15	19 28	29	22	52	46
5	11 48 36	12 56	9 04	16 29	1 11	2 05	20 07	19 20	29	20	53	44
7	11 48 00	12 59	9 02	16 27	1 02	1 57	19 59	19 12	30	19	54	42
9	11 47 27	13 02	9 00	16 26	0 53	1 48	19 51	19 04	31	17	55	40
11	11 46 54	13 05	8 58	16 24	0 44	1 40	19 44	18 56	31	15	55	38
13	11 46 24	13 07	8 57	16 22	0 36	1 32	19 36	18 48	32	13	56	36
15	11 45 56	13 10	8 56	16 21	0 27	1 23	19 28	18 41	33	11	57	35
17	11 45 30	13 12	8 55	16 19	0 18	1 15	19 20	18 33	5 34	17 10	5 58	17 33
19	11 45 06	13 14	8 54	16 18	0 09	1 06	19 12	18 25	35	08	5 59	31
21	11 44 45	13 15	8 53	16 16	23 57	0 58	19 04	18 17	36	07	6 00	30
23	11 44 26	13 16	8 52	16 15	23 47	0 50	18 56	18 09	36	05	01	28
25	11 44 10	13 17	8 52	16 13	23 38	0 41	18 48	18 01	37	04	02	27
27	11 43 56	13 17	8 51	16 12	23 29	0 33	18 40	17 54	38	02	03	25
29	11 43 46	13 15	8 51	16 11	23 20	0 24	18 33	17 46	39	01	04	24
31	11 43 39	13 13	8 51	16 09	23 11	0 16	18 25	17 38	5 40	17 00	6 05	17 22

Sun enters : Tula (Sidereal) Oct. 17, 21*h* 51*m* ***Trop. Scorpio*** (♏) : Oct. 23, 26*h* 22*m*

Last Quarter : 2nd, 9*h* 32*m* & 31st, 17*h* 34*m* 1st Oct. : Pluto M. Pass 15*h* 54*m* ***New Moon*** **: 9th, 17*h* 04*m***

Nirayana Longitudes at 0ʰ U.T. or 5-30 a.m. I.S.T.

Date	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	14 naks.	10 naks.	18 naks.	*1 naks.*	*2 naks.*	*22 naks.*	*21 naks.*	17 naks.	8/22 naks.
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
1	5 29 51	4 1 38	7 24 47	0 *R*8 58	0*R*22 27	9*R*19 13	9 *R* 7 47	7 14 23	3 16 05
2	6 1 22	2 15	25 29	8 52	22 24	19 12	7 47	14 25	16 02
3	2 52	2 53	26 10	8 45	22 21	19 11	7 46	14 26	15 59
4	4 21	3 33	26 52	8 38	22 17	19 10	7 46	14 28	15 56
5	n 5 50	4 13	27 34	8 31	22 14	19 09	7 46	14 29	15 53
6	6 7 18	4 4 55	7 28 16	0 8 24	0 22 10	9 19 08	9 7 45	7 14 31	3 15 49
7	8 44	5 38	28 58	8 17	22 07	19 07	7 45	14 32	15 46
8	10 10	6 22	7 n29 41	8 09	22 03	19 07	7 45	14 34	15 43
9	11 35	7 07	8 0 23	8 02	21 59	19 06	7 45	14 35	15 40
10	12 59	7 53	1 06	7 54	21 55	19 05	7 45	14 37	15 37
11	6 14 22	4 8 40	8 1 48	0 7 47	0 21 52	9 19 05	9 7 44	7 14 38	3 15 34
12	15 44	9 28	2 31	7 39	21 48	19 04	7 44	14 40	15 30
13	17 05	10 16	3 14	7 31	21 44	19 03	7 44	14 42	15 27
14	18 25	11 05	3 57	7 23	21 39	19 03	**D** 7 44	14 43	15 24
15	n 19 44	11 56	4 40	7 15	21 35	19 03	7 44	14 45	15 21
16	6 21 01	4n12 46	8 5 23	0 7 07	0 21 31	9 19 02	9 7 44	7 14 47	3 15 18
17	22 17	13 38	6 06	6 59	21 27	19 02	7 44	14 49	15 14
18	23 32	14 30	6 49	6 51	21 23	19 01	7 44	14 50	15 11
19	24 45	15 23	7 33	6 43	21 18	19 01	7 45	14 52	15 08
20	25 56	16 17	8 16	6 35	21 14	19 01	7 45	14 54	15 05
21	6 27 06	4 17 11	8 9 00	0 6 27	0 21 09	9 19 01	9 7 45	7 14 56	3 15 02
22	28 14	18 06	9 44	6 19	21 05	19 01	7 45	14 58	14 59
23	6 29 19	19 02	10 27	8 6 11	21 00	**D** 19 01	7 46	15 00	14 55
24	7 e 0 23	19 58	11 11	6 03	20 56	19 01	7 46	15 01	14 52
25	1 23	20 55	11 55	5 55	20 51	19 01	7 46	15 03	14 49
26	7 2 21	4 21 52	8 n12 39	0 5 47	0 20 46	9 19 01	9 7 47	7 15 05	3 14 46
27	n 3 16	22 50	13 23	5 38	20 42	19 01	7 47	15 07	14 43
28	4 07	23 48	14 07	5 30	20 37	19 01	7 47	15 09	14 40
29	4 54	24 47	14 51	5 22	20 32	19 02	7 48	15 11	14 36
30	5 37	n 25 46	15 36	5 14	20 28	19 02	7 48	15 13	14 33
31	7 6 15	4 e26 46	8 16 20	0 5 06	0 20 23	9 19 02	9 7 49	7 15 15	3 14 30

Lunar Asvina Krishnadi (Kartika-Vadi) begins from October 24, 26h 32m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '
1	0S 33	9S42	3 S37	9 N38	1 S49	24S46	1 S32	11N01	2 S35	14N15	0S 42	17S34	0N16	19S32
3	0 47	11 02	3 18	9 30	1 49	24 52	1 32	10 56	2 35	14 12	0 42	17 35	0 16	19 33
5	1 02	12 19	2 59	9 20	1 49	24 58	1 32	10 51	2 35	14 10	0 42	17 35	0 16	19 33
7	1 16	13 34	2 41	9 08	1 48	25 03	1 32	10 46	2 36	14 08	0 42	17 35	0 16	19 33
9	1 30	14 45	2 23	8 54	1 48	25 06	1 32	10 41	2 36	14 06	0 42	17 36	0 16	19 33
11	1 44	15 53	2 06	8 37	1 47	25 09	1 32	10 36	2 36	14 03	0 42	17 36	0 16	19 33
13	1 56	16 57	1 49	8 18	1 47	25 11	1 33	10 30	2 36	14 01	0 42	17 36	0 16	19 33
15	2 09	17 57	1 33	7 57	1 47	25 12	1 33	10 25	2 36	13 58	0 42	17 36	0 15	19 33
17	2 20	18 54	1 18	7 34	1 46	25 12	1 33	10 19	2 37	13 55	0 42	17 37	0 15	19 33
19	2 31	19 46	1 02	7 08	1 46	25 11	1 33	10 14	2 37	13 53	0 41	17 37	0 15	19 33
21	2 40	20 34	0 48	6 41	1 45	25 09	1 32	10 08	2 37	13 50	0 41	17 37	0 15	19 33
23	2 48	21 16	0 34	6 12	1 44	25 06	1 32	10 02	2 37	13 47	0 41	17 37	0 15	19 33
25	2 54	21 53	0 20	5 41	1 44	25 02	1 32	9 57	2 37	13 45	0 41	17 37	0 15	19 33
27	2 58	22 23	0 S07	5 08	1 43	24 57	1 32	9 51	2 37	13 42	0 41	17 36	0 15	19 33
29	2 59	22 47	0N05	4 34	1 42	24 51	1 32	9 46	2 37	13 39	0 41	17 36	0 15	19 33
31	2 S57	23S03	0N16	3 N59	1 S41	24S44	1 S32	9N40	2 S37	13N36	0S 41	17S36	0N15	19S32

1st Oct. : Rahu Decli. 17°N 24'

1st Oct. Pluto : Lat. 11°N 08', Decli 10°S 41'

First Quarter : 17th, 20*h* 30*m*

Full Moon : 24th, 26h 32m

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0h U.T. or 5-30 a.m. I.S.T. Sun ⊙ Longitude	Sun ⊙ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
			h m s	15 Nakshatra s ° ′ ″	° ′	s ° ′ ″	° ′	° ′	h m			8/22 naks s ° ′
1 M	305	10	14 40 27	6 14 15 40	14S 13	3 20 31 29	0 N 31	17N01	6 30	9	24	3 14 41
2 Tu	306	11	14 44 24	15 15 42	14 32	4 03 53 08	1 40	13 49	7 21	10	25	14 40
3 W	307	12	14 48 20	16 15 46	14 51	4 16 58 23	2 42	10 00	8 10	11	26	14 38
4 Th	308	13	14 52 17	17 15 52	15 10	4 29 49 39	3 34	5 47	9 02	12	27	14 33
5 F	309	14	14 56 14	18 15 59	15 28	5 12 28 57	4 15	1N24	9 41	13	28	14 25
6 St	310	15	15 00 10	6n19 16 08	15 47	5 24 57 55	4 43	3 S00	10 25	14	28	3 14 13
7 ☉	311	16	15 04 07	20 16 20	16 05	6 07 17 35	4 58	7 13	11 09	15	29	14 00
8 M	312	17	15 08 03	21 16 34	16 22	6♂19 28 44	4 58	11 06	11 53	15	30	13 46
9 Tu	313	18	15 12 00	22 16 50	16 40	7 01 32 04	4 45	14 29	12 38	16	1	13 31
10 W	314	19	15 15 56	23 17 07	16 57	7 13 28 35	4 20	17 15	13 24	17	2	13 18
11 Th	315	20	15 19 53	6 24 17 26	17 14	7 25 19 47	3 43	19 17	14 11	18	3	3 13 08
12 F	316	21	15 23 49	25 17 46	17 31	8 07 07 51	2 57	20 29	14 58	19	4	13 00
13 St	317	22	15 27 46	26 18 07	17 47	8 18 55 47	2 03	20 47	15 47	20	5	12 55
14 ☉	318	23	15 31 43	27 18 31	18 03	9 00 47 29	1 04	20 09	16 35	21	6	12 52
15 M	319	24	15 35 39	28 18 56	18 19	9 12 47 29	0 N 00	18 36	17 24	22	7	12 52
16 Tu	320	25	15 39 36	6 29 19 22	18 34	9 25 00 56	1 S 04	16 11	18 12	23	8	3 12 52
17 W	321	26	15 43 32	7 00 19 50	18 49	10 07 33 10	2 07	12 58	19 06	24	9	12 52
18 Th	322	27	15 47 29	01 20 19	19 04	10 20 29 19	3 06	. 9 01	19 48	25	10	12 50
19 F	323	28	15 51 25	n 02 20 49	19 18	11 03 53 30	3 56	4S 31	20 37	26	11	12 46
20 St	324	29	15 55 22	03 21 20	19 32	11 17 48 03	4 35	0N23	21 28	27	12	12 40
21 ☉	325	30	15 59 18	7 04 21 52	19 46	0 02 12 27	4 58	5 26	22 21	1	13	3 12 31
22 M	326	1	16 03 15	05 22 26	19 59	0 17 02 47	5 02	10 18	23 18	2	14	12 21
23 Tu	327	2	16 07 12	06 23 01	20 12	1ȣ02 11 26	4 45	14 39	—	3	15	12 11
24 W	328	3	16 11 08	07 23 38	20 24	1 17 28 11	4 07	18 03	0 17	4	16	12 01
25 Th	329	4	16 15 05	08 24 16	20 37	2 02 41 48	3 12	20 11	1 20	5	18	11 53
26 F	330	5	16 19 01	7 09 24 56	20 48	2 17 42 09	2 05	20 52	2 22	6	19	3 11 48
27 St	331	6	16 22 58	10 25 38	21 00	3 02 21 42	0 S 50	20 05	3 24	7	20	11 46
28 ☉	332	7	16 26 54	11 26 21	21 11	3 16 36 20	0 N 26	18 02	4 22	8	21	11 45
29 M	333	8	16 30 51	12 27 05	21 22	4 00 24 57	1 38	14 59	5 17	10	22	11 46
30 Tu	334	9	16 34 47	7 13 27 51	21S 32	4 13 48 53	2 N 43	11N13	6 08	11	23	3 11 47

Lunar Kartika (Sukladi-Sudi) begins from November 8, 9h 23m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	11 43 36	13 11	8 50	16 08	23 07	0 12	18 21	17 34	5 41	16 59	6 05	17 22
3	11 43 34	13 06	8 50	16 07	22 58	0 03	18 13	17 26	42	58	06	21
5	11 43 35	13 00	8 50	16 06	22 49	23 50	18 05	17 19	43	57	07	20
7	11 43 39	12 51	8 50	16 04	22 40	23 42	17 57	17 11	44	56	09	19
9	11 43 47	12 39	8 50	16 03	22 31	23 33	17 50	17 03	45	55	10	18
11	11 43 58	12 25	8 51	16 02	22 23	23 25	17 42	16 55	47	54	11	17
13	11 44 13	12 09	8 51	16 00	22 14	23 16	17 34	16 48	48	53	12	16
15	11 44 30	11 51	8 51	15 59	22 05	23 08	17 26	16 40	49	53	14	15
17	11 44 51	11 32	8 51	15 57	21 57	22 59	17 19	16 32	5 50	16 52	6 15	17 15
19	11 45 16	11 16	8 52	15 56	21 48	22 51	17 11	16 25	52	52	16	14
21	11 45 43	11 02	8 52	15 55	21 39	22 42	17 03	16 17	53	51	18	14
23	11 46 14	10 50	8 53	15 53	21 31	22 34	16 56	16 10	54	51	19	14
25	11 46 48	10 41	8 53	15 52	21 22	22 26	16 48	16 02	56	51	20	13
27	11 47 25	10 35	8 54	15 50	21 14	22 17	16 40	15 54	57	51	22	13
29	11 48 05	10 30	8 55	15 49	21 05	22 09	16 33	15 46	58	51	23	13
30	11 48 26	10 29	8 55	15 48	21 01	22 05	16 29	15 42	5 59	16 51	6 24	17 13

Sun enters : ***Vrischika*** (Sidereal) Nov. 16, 21*h* 38*m* ***Trop. Sagittarius*** (♐) : Nov. 22, 23*h* 55*m*

New Moon : 8th, ***9h 23m*** 1st Nov. : Pluto M. Pass. 13*h* 55*m* ***First Quarter : 16th, 14h 33m***

Date	*Nirayana* Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	17 naks.	12 naks.	20 naks.	*1 naks.*	*2 naks.*	22 naks.	21 naks.	17 naks.	8/22 naks.
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
1	7 6 47	4 27 46	8 17 04	0 *R* 4 58	0*R*20 18	9 19 03	9 7 50	7 15 17	3 14 27
2	7 14	28 47	17 49	4 50	20 13	19 03	7 50	15 20	14 24
3	7 34	4 29 48	18 34	4 43	20 07	19 04	7 51	15 22	14 20
4	7 47	5 0 50	19 18	4 35	20 03	19 04	7 52	15 24	14 17
5	**R**7 52	1 52	20 03	4 27	19 59	19 05	7 52	15 26	14 14
6	7 7 49	5 2 54	8 20 48	0 4 20	0☋19 54	9 19 06	9 7 53	7 15 28	3 14 11
7	7 37	3 56	21 33	4 12	19 49	19 06	7 54	15 30	14 08
8	*s* 7 15	4 59	22 18	4 05	19 44	19 07	7 55	15 32	14 05
9	6 43	6 03	23 03	3 57	19 39	19 08	7 55	15 35	14 01
10	6 02	7 06	23 48	3 50	19 34	19 09	7 56	15 37	13 58
11	7 5 10	5 8 10	8 24 33	0 3 43	0 19 30	9 19 10	9 7 57	7 15 39	3 13 55
12	*n* 4 10	n 9 15	25 18	3 36	19 25	19 11	7 58	15 41	13 52
13	3 02	10 19	n 26 03	3 29	19 20	19 12	7 59	15 43	13 49
14	1 48	11 24	26 48	3 22	19 15	19 13	8 00	15 46	13 45
15	7♂0 29	12 29	27 34	3 15	19 10	19 14	8 01	15 48	13 42
16	6 29 08	5 13 35	8 28 19	0 3 09	0 19 06	9 19 15	9 8 02	7 15 50	3 13 39
17	27 48	14 41	29 05	3 02	19 01	19 16	8 03	15 52	13 36
18	26 32	15 47	8 29 50	2 56	18 56	19 18	8 05	15 55	13 33
19	25 21	16 53	9 0 36	2 50	18 52	19 19	8 06	15 57	13 30
20	**r** 24 18	17 59	1 21	2 44	18 47	19 20	8 07	15 59	13 26
21	6 23 25	5 19 06	9 2 07	0 2 38	0 18 42	9 19 22	9 8 08	7 16 02	3 13 23
22	22 43	20 13	2 53	2 33	18 38	19 23	8 09	16 04	13 20
23	22 13	21 20	3 38	2 27	18 33	19 25	8 11	16 06	13 17
24	21 54	n 22 28	4 24	2 22	18 29	19 26	8 12	16 08	13 14
25	**D** 21 46	23 36	5 10	2 17	18 24	19 28	8 13	16 11	13 10
26	6 21 50	5 24 43	9 5 56	0 2 12	0 18 20	9 19 30	9 8 15	7 16 13	3 13 07
27	22 04	25 52	6 42	2 07	18 16	19 31	8 16	16 15	13 04
28	22 27	27 00	7 27	2 02	18 12	19 33	8 17	16 18	13 01
29	22 59	28 08	8 13	1 58	18 07	19 35	8 19	16 20	12 58
30	6 23 39	5 29 17	9 8 59	0 1 54	0 18 03	9 19 37	9 8 20	7 16 22	3 12 55

Lunar Kartika Krishnadi (Margasirsha-Vadi) begins from November 23, 12h 34m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '
1	2 S 55	23S08	0N22	3N40	1 S41	24S40	1 S32	9N38	2 S37	13N35	0 S41	17S36	0N15	19S32
3	2 47	23 10	0 34	3 02	1 40	24 31	1 31	9 32	2 37	13 32	0 41	17 36	0 15	19 32
5	2 35	23 02	0 44	2 23	1 39	24 22	1 31	9 27	2 37	13 29	0 41	17 35	0 15	19 32
7	2 16	22 41	0 54	1 42	1 39	24 11	1 31	9 22	2 37	13 27	0 41	17 35	0 15	19 32
9	1 52	22 05	1 03	1 00	1 38	23 59	1 30	9 17	2 37	13 24	0 41	17 34	0 15	19 31
11	1 20	21 15	1 12	0N18	1 37	23 46	1 30	9 12	2 37	13 21	0 41	17 34	0 15	19 31
13	0 43	20 10	1 20	0 S26	1 36	23 32	1 30	9 08	2 37	13 18	0 41	17 33	0 15	19 30
15	0 S02	18 54	1 28	1 10	1 35	23 18	1 29	9 03	2 36	13 16	0 41	17 32	0 15	19 30
17	0 N38	17 34	1 35	1 56	1 34	23 02	1 29	8 59	2 36	13 13	0 41	17 32	0 15	19 30
19	1 15	16 19	1 42	2 41	1 33	22 45	1 28	8 55	2 36	13 10	0 41	17 31	0 15	19 29
21	1 46	15 17	1 48	3 28	1 32	22 27	1 28	8 51	2 36	13 08	0 40	17 30	0 15	19 29
23	2 09	14 35	1 53	4 15	1 30	22 08	1 27	8 48	2 36	13 05	0 40	17 29	0 15	19 28
25	2 24	14 13	1 58	5 02	1 29	21 49	1 27	8 44	2 35	13 03	0 40	17 28	0 15	19 27
27	2 31	14 11	2 02	5 49	1 29	21 28	1 27	8 41	2 35	13 01	0 40	17 27	0 15	19 27
29	2 33	14 25	2 06	6 37	1 27	21 07	1 26	8 38	2 35	12 58	0 40	17 26	0 15	19 26
30	2 N31	14S38	2N08	7 S00	1 S26	20S55	1 S26	8N37	2 S34	12N57	0 S40	17S25	0N15	19S26

1st Nov. : Rahu Decli. 18° N 08'   1st Nov. Pluto : Lat. 10°N 57', Decli. 10°S 59'

Full Moon : 23rd, 12*h* 34*m*   **Last Quarter : 29th, 28*h* 48*m***

Date	Day of year	Indian Date	Sidereal Time (Noon)	At 0^h U.T. or 5-30 a.m. I.S.T. Sun ☉ Longitude	Sun ☉ Decli.	Moon ☽ Longitude	Moon ☽ Lat.	Moon ☽ Decli.	Moon ☽ M.Pass. L.M.T.	Nakshatra	Tithi	Moon's Node ☊ Rahu (True)
			h m s	17 Nakshatra s ° ' "	° '	s ° ' "	° '	° '	h m			8/22 naks s ° '
1 W	335	10	16 38 44	7 14 28 38	21S 42	4 26 50 53	3 N 37	7N01	6 56	12	24	3 11 46
2 Th	336	11	16 42 41	15 29 27	21 51	5 09 34 24	4 19	2N36	7 41	12	25	11 43
3 F	337	12	16 46 37	n 16 30 18	22 00	5 22 02 54	4 48	1 S49	8 25	13	26	11 38
4 St	338	13	16 50 34	17 31 09	22 09	6 04 19 34	5 03	6 06	9 08	14	27	11 31
5 Su	339	14	16 54 30	18 32 02	22 17	6 16 27 06	5 04	10 05	9 51	15	28	11 21
6 M	340	15	16 58 25	7 19 32 56	22 24	6 28 27 40	4 52	13 38	10 36	16	29	3 11 11
7 Tu	341	16	17 02 23	20 33 52	22 32	7♂10 23 00	4 27	16 37	11 21	17	30	11 00
8 W	342	17	17 06 20	21 34 48	22 38	7 22 14 38	3 50	18 53	12 08	18	1	10 51
9 Th	343	18	17 10 16	22 35 45	22 45	8 04 04 03	3 04	20 21	12 55	19	1	10 43
10 F	344	19	17 14 13	23 36 44	22 51	8 15 53 00	2 09	20 56	13 44	20	2	10 37
11 St	345	20	17 18 10	7 24 37 43	22 56	8 27 43 36	1 09	20 35	14 32	21	3	3 10 34
12 Su	346	21	17 22 06	25 38 43	23 01	9 09 38 37	0 N 05	19 18	15 20	21	4	10 33
13 M	347	22	17 26 03	26 39 44	23 06	9 21 41 23	1 S 00	17 08	16 08	22	5	10 33
14 Tu	348	23	17 29 59	27 40 45	23 10	10 03 55 51	2 04	14 11	16 55	23	6	10 35
15 W	349	24	17 33 56	28 41 47	23 14	10 16 26 25	3 03	10 32	17 41	24	7	10 36
16 Th	350	25	17 37 52	7 n29 42 49	23 17	10 29 17 34	3 54	6 18	18 28	25	8	3 10 37
17 F	351	26	17 41 49	8 00 43 51	23 20	11 12 33 24	4 35	1 S40	19 16	26	9	10 36
18 St	352	27	17 45 45	01 44 54	23 22	11 26 16 53	5 02	3N12	20 06	27	10	10 34
19 Su	353	28	17 49 42	02 45 57	23 24	0 10 29 03	5 11	8 04	20 59	1	11	10 30
20 M	354	29	17 53 39	03 47 01	23 25	0 25 08 07	5 01	12 38	21 56	2	12	10 24
21 Tu	355	30	17 57 35	8 04 48 05	23 26	1 10 09 00	4 30	16 31	22 56	4	13	3 10 19
22 W	356	1	18 01 32	05 49 09	23 26	1☊25 23 27	3 40	19 21	23 59	5	15	10 14
23 Th	357	2	18 05 28	06 50 14	23 26	2 10 41 08	2 34	20 48	—	6	16	10 10
24 F	358	3	18 09 25	07 51 20	23 26	2 25 51 19	1 S 17	20 43	1 04	7	17	10 07
25 St	259	4	18 13 21	08 52 26	23 25	3 10 44 37	0 N 03	19 10	2 06	8	18	10 07
26 Su	360	5	18 17 18	8 09 53 32	23 23	3 25 14 24	1 22	16 24	3 05	9	19	3 10 07
27 M	361	6	18 21 14	10 54 39	23 21	4 09 17 05	2 33	12 44	4 00	10	20	10 09
28 Tu	362	7	18 25 11	11 55 47	23 19	4 22 52 05	3 33	8 31	4 51	11	21	10 10
29 W	363	8	18 29 08	n 12 56 55	23 16	5 06 01 02	4 20	4N02	5 38	12	22	10 11
30 Th	364	9	18 33 04	13 58 03	23 12	5 18 47 05	4 53	0 S30	6 23	13	23	10 11
31 F	365	10	18 37 01	8 14 59 12	23 09	6 01 14 08	5 11	4 53	7 07	14	24	3 10 10
32 St	1	11	18 40 57	8 16 00 21	23 S06	6 13 26 22	5 N14	8 S59	7 50	15	25	3 10 08

Lunar Margasirsa (Sukladi-Sudi) begins from December 7, 28h 02m

Date	Apparent Noon L.M.T.	Local mean time of Meridian passages ☿	♀	♂	♃	♄	♅	♆	Calcutta Sunrise I.S.T. (upper limb)	Calcutta Sunset I.S.T. (upper limb)	Central Station Sunrise I.S.T. (upper limb)	Central Station Sunset I.S.T. (upper limb)
	h m s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	11 48 48	10 28	8 56	15 47	20 57	22 00	16 25	15 39	6 00	16 51	6 24	17 13
3	11 49 33	10 28	8 56	15 46	20 49	21 52	16 18	15 31	01	51	26	13
5	11 50 21	10 28	8 57	15 44	20 40	21 44	16 10	15 23	02	51	27	14
7	11 51 11	10 30	8 58	15 42	20 32	21 35	16 02	15 16	04	52	28	14
9	11 52 04	10 32	9 00	15 41	20 24	21 27	15 55	15 08	05	52	30	15
11	11 52 58	10 35	9 01	15 39	20 16	21 19	15 47	15 00	06	53	31	15
13	11 53 54	10 39	9 02	15 37	20 08	21 10	15 40	14 53	06	53	32	16
15	11 54 51	10 43	9 03	15 36	20 00	21 02	15 32	14 45	09	54	34	16
17	11 55 49	10 47	9 04	15 34	19 52	20 54	15 25	14 38	6 10	16 55	6 35	17 17
19	11 56 47	10 52	9 06	15 32	19 44	20 46	15 17	14 30	11	56	36	18
21	11 57 47	10 56	9 07	15 31	19 36	20 37	15 10	14 22	12	57	37	19
23	11 58 46	11 01	9 09	15 29	19 28	20 29	15 02	14 15	13	58	38	20
25	11 59 46	11 06	9 11	15 27	19 20	20 21	14 55	14 07	14	16 59	39	21
27	12 00 45	11 12	9 13	15 25	19 13	20 13	14 47	14 00	15	17 00	40	22
29	12 01 44	11 17	9 14	15 23	19 05	20 05	14 40	13 52	15	01	40	23
31	12 02 42	11 23	9 16	15 21	18 57	19 57	14 32	13 44	6 16	17 02	6 41	17 25

Sun enters : ***Dhanus*** (Sidereal) Dec. 16, 12*h* 15*m* ***Trop. Capricorn*** **(♑)** : Dec. 22, 13*h* 14*m*

New Moon : 7th, 28*h* 02*m* 1st. Dec. : Pluto M. Pass. 12*h* 02*m* ***First Quarter*** **: 16th, 6*h* 20*m***

31st Dec. : Pluto M. Pass. 10*h* 08*m*

Date	*Nirayana* Longitudes at 0^h U.T. or 5-30 a.m. I.S.T.								
	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu ☊ (Mean)
	16 naks.	14 naks.	21 naks.	*1 naks.*	*2 naks.*	22 naks.	21 naks.	17 naks.	8/22 naks.
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
1	6 24 25	6 0 26	9 n 9 45	0*R* 1 49	0*R*17 59	9 19 38	9 8 22	7 16 25	3 12 51
2	25 18	1 35	10 32	1 45	17 55	19 40	8 23	☌ 16 27	12 48
3	e 26 16	2 44	11 18	1 42	17 51	19 42	8 25	16 29	12 45
4	27 18	3 53	12 04	1 38	17 47	19 44	8 26	16 32	12 42
5	28 25	5 03	12 50	1 35	17 43	19 46	8 28	16 34	12 39
6	6 29 34	6 n 6 13	9 13 36	0 1 32	0 17 40	9 19 48	9 8 30	7 16 36	3 12 36
7	7 0 47	7 23	14 22	1 29	17 36	19 51	8 31	n 16 39	12 32
8	n 2 03	8 33	15 08	1 26	17 32	19 53	8 33	16 41	12 29
9	3 21	9 43	15 55	1 24	17 29	19 55	8 35	16 43	12 26
10	4 40	10 53	16 41	1 21	17 25	19 57	8 36	16 46	12 23
11	7 6 01	6 12 03	9 17 27	0 1 19	0 17 22	9 20 00	9 8 38	7 16 48	3 12 20
12	7 24	13 14	18 14	1 17	17 19	20 02	8 40	16 50	12 16
13	8 48	14 25	19 00	1 16	17 16	20 04	8 42	16 53	12 13
14	10 13	15 35	19 47	1 14	17 12	20 07	8 44	16 55	12 10
15	11 39	16 46	20 33	1 13	17 09	20 09	8 45	16 57	12 07
16	7 13 06	6 17 57	9 21 19	0 1 12	0 17 07	9 20 12	9 8 47	7 17 00	3 12 04
17	14 33	n 19 08	22 06	1 11	17 04	20 14	8 49	17 02	12 01
18	n 16 01	20 20	n 22 52	1 10	17 01	20 17	8 51	17 04	11 57
19	17 30	21 31	23 39	1 10	16 58	20 19	8 53	17 06	11 54
20	18 59	22 42	24 25	**D** 1 09	16 56	20 22	8 55	17 09	11 51
21	7 20 29	6 23 54	9 25 12	0 1 09	0 16 53	9 20 25	9 8 57	7 17 11	3 11 48
22	21 59	25 05	25 58	1 10	16 51	20 27	8 59	17 13	11 45
23	23 29	26 17	26 45	1 10	16 49	20 30	9 01	17 15	11 41
24	24 59	27 29	27 31	1 11	16 47	20 33	9 03	17 18	11 38
25	26 30	28 41	28 18	1 11	16 45	20 36	9 05	17 20	11 35
26	7 28 02	6 29 53	9 29 04	0 1 12	0 16 43	9 20 38	9 9 07	7 17 22	3 11 32
27	7 n 29 s 33	7 1 05	9 29 51	1 14	16 41	20 41	9 09	17 24	11 29
28	8 1 05	n 2 17	10 0 37	1 15	16 39	20 44	9 11	17 26	11 26
29	2 37	3 29	1 24	1 17	16 37	20 47	9 13	17 29	11 22
30	4 10	4 42	2 10	1 19	16 36	20 50	9 15	17 31	11 19
31	8 5 42	7 5 54	10 2 57	0 1 21	0 16 34	9 20 53	9 9 17	7 17 33	3 11 16
32	8 7 16	7 7 07	10 3 43	0 1 23	0 16 33	9 20 56	9 9 19	7 17 35	3 11 13

Lunar Margasirsha Krishnadi (Pausa-Vadi) begins from December 22, 23h 01m

Date	☿ Mercury		♀ Venus		♂ Mars		♃ Jupiter		♄ Saturn		♅ Uranus		♆ Neptune	
	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli	Lat.	Decli
	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '	° '
1	2 N29	14 S53	2N10	7S24	1 S26	20S44	1 S25	8 N36	2 S34	12N56	0 S40	17S25	0N15	19S26
3	2 22	15 29	2 13	8 11	1 25	20 21	1 25	8 34	2 34	12 54	0 40	17 24	0 15	19 25
5	2 12	16 12	2 15	8 59	1 23	19 57	1 24	8 32	2 34	12 52	0 40	17 23	0 15	19 24
7	2 00	16 59	2 17	9 45	1 22	19 32	1 24	8 30	2 33	12 50	0 40	17 21	0 14	19 24
9	1 47	17 48	2 18	10 32	1 21	19 06	1 23	8 29	2 33	12 48	0 40	17 20	0 14	19 23
11	1 33	18 37	2 19	11 18	1 19	18 39	1 22	8 28	2 32	12 47	0 40	17 18	0 14	19 23
13	1 18	19 25	2 20	12 03	1 18	18 12	1 22	8 27	2 32	12 45	0 40	17 17	0 14	19 21
15	1 03	20 11	2 20	12 47	1 17	17 44	1 21	8 26	2 31	12 44	0 40	17 16	0 14	19 21
17	0 48	20 55	2 20	13 31	1 15	17 15	1 21	8 26	2 31	12 43	0 40	17 14	0 14	19 20
19	0 33	21 36	2 19	14 13	1 14	16 46	1 20	8 27	2 30	12 41	0 40	17 13	0 14	19 19
21	0 18	22 13	2 18	14 55	1 12	16 16	1 19	8 27	2 30	12 40	0 40	17 11	0 14	19 18
23	0 N03	22 47	2 16	15 35	1 11	15 45	1 19	8 28	2 29	12 39	0 40	17 09	0 14	19 17
25	0 S11	23 18	2 14	16 14	1 10	15 13	1 19	8 29	2 29	12 39	0 40	17 08	0 14	19 16
27	0 25	23 41	2 12	16 52	1 08	14 42	1 17	8 30	2 28	12 38	0 40	17 06	0 14	19 15
29	0 38	24 02	2 09	17 28	1 07	14 09	1 17	8 32	2 28	12 37	0 40	17 04	0 14	19 14
31	0 S51	24 S17	2N06	18S02	1 S05	13S19	1 S16	8 N34	2 S27	12N37	0 40	17S03	0N14	19S14

1st Dec. : Rahu Decli. 18°N 53' — 1st Dec. Pluto : Lat. 10°N 51' Decli 11°S 14'

1st Jan. : Rahu Decli. 19°N 16' — 2000 A.D. 1st Jan. Pluto : Lat. 10°N 51' Decli 11°S 24'

Full Moon : 22nd, 23*h* 01*m* — **Last Quarter : 29th, 19*h* 34*m***

Daily Motion of Moon (☽) in 1999

Date	January			March			May			July			September			November		
	°	'	"	°	'	"	°	'	"	°	'	"	°	'	"	°	'	"
1	14	34	35	12	59	20	11	53	49	12	28	26	14	12	37	13	21	39
2	14	18	05	12	45	56	11	52	09	12	40	28	14	12	58	13	05	15
3	13	56	19	12	32	39	11	52	16	12	54	39	14	11	01	12	51	16
4	13	31	42	12	20	06	11	55	08	13	11	07	14	07	05	12	39	18
5	13	06	49	12	09	00	12	00	27	13	29	36	14	01	24	12	28	58
6	12	43	40	12	00	10	12	09	56	13	49	30	13	53	56	12	19	40
7	12	23	51	11	54	23	12	23	49	14	09	34	13	44	32	12	11	09
8	12	08	25	11	52	20	12	42	27	14	28	03	13	37	07	12	03	20
9	11	57	52	11	54	35	13	05	45	14	48	45	13	19	48	11	56	31
10	11	52	20	12	01	31	13	32	52	14	51	34	13	04	53	11	51	12
11	11	51	36	12	13	15	14	02	10	14	52	50	12	49	08	11	48	04
12	11	55	14	12	29	40	14	30	-57	14	45	59	12	33	25	11	47	56
13	12	02	39	12	50	07	14	55	47	14	31	40	12	18	49	11	51	42
14	12	12	59	13	13	35	15	12	56	14	11	31	12	06	27	12	00	00
15	12	25	22	13	38	26	15	19	36	13	47	47	11	57	17	12	13	27
16	12	38	56	14	02	31	15	14	39	13	22	57	11	52	09	12	32	14
17	12	52	50	14	23	24	14	59	06	12	59	01	11	51	37	12	56	09
18	13	06	23	14	38	44	14	35	49	12	37	39	11	56	06	13	24	11
19	13	19	10	14	46	46	14	08	19	12	19	56	12	05	38	13	54	33
20	13	30	59	14	46	50	13	40	05	12	06	31	12	20	00	14	24	24
21	13	41	44	14	39	35	13	13	38	11	57	33	12	38	34	14	50	20
22	13	51	34	14	26	34	12	50	37	11	53	03	13	00	14	15	08	39
23	14	00	18	14	09	59	12	31	46	11	52	37	13	23	26	15	16	45
24	14	07	49	13	51	56	12	17	15	11	55	53	13	46	15	15	13	37
25	14	13	34	13	34	06	12	06	40	12	02	15	14	06	21	15	00	21
26	14	16	55	13	17	34	11	59	31	12	11	07	14	21	45	14	39	33
27	14	17	04	13	02	48	11	55	06	12	21	55	14	30	58	14	14	38
28	14	13	20	12	49	50	11	52	53	12	34	02	14	33	31	13	48	37
29	14	05	24	12	38	25	11	52	25	12	47	03	14	29	54	13	23	56
30	13	53	21	12	28	14	11	53	25	13	00	33	14	21	34	13	02	00
31	13	37	51	12	18	59	11	55	53	13	14	14		—			—	

Date	February			April			June			August			October			December		
	°	'	"	°	'	"	°	'	"	°	'	"	°	'	"	°	'	"
1	13	19	54	12	10	36	12	00	07	13	27	55	14	10	11	12	43	31
2	13	00	55	12	03	12	12	06	31	13	41	20	13	57	27	12	28	30
3	12	42	15	11	57	11	12	15	36	13	54	10	13	44	33	12	16	40
4	12	25	15	11	53	05	12	28	03	14	05	54	13	32	11	12	07	32
5	12	11	01	11	51	37	12	44	14	14	15	56	13	20	29	12	00	34
6	12	00	28	11	53	33	13	04	16	14	23	18	13	09	14	11	55	20
7	11	54	11	11	59	32	13	27	49	14	27	09	12	58	03	11	51	38
8	11	52	34	12	10	10	13	53	44	14	26	36	12	46	41	11	49	25
9	11	55	39	12	25	44	14	20	02	14	21	13	12	35	03	11	48	57
10	12	03	21	12	46	13	14	43	58	14	10	53	12	23	21	11	50	36
11	12	15	13	13	11	02	15	02	14	13	56	12	12	12	08	11	55	01
12	12	30	35	13	38	51	15	11	56	13	38	07	12	02	12	12	02	46
13	12	48	30	14	07	32	15	11	13	13	18	08	11	54	26	12	14	28
14	13	07	45	14	34	08	15	00	08	12	57	42	11	49	48	12	30	34
15	13	26	57	14	55	15	14	40	26	12	38	21	11	49	09	12	51	09
16	13	44	39	15	07	53	14	15	06	12	21	22	11	53	12	13	15	50
17	13	59	35	15	10	07	13	47	17	12	07	46	12	02	31	13	43	29
18	14	10	41	15	01	56	13	19	54	11	58	16	12	17	16	14	12	10
19	14	17	27	14	45	08	12	55	00	11	53	18	12	37	14	14	39	04
20	14	19	53	14	22	40	12	33	55	11	52	59	13	01	41	15	00	53
21	14	18	21	13	57	46	12	17	13	11	57	13	13	29	06	15	14	27
22	14	13	38	13	33	12	12	05	02	12	05	43	13	57	18	15	17	41
23	14	06	29	13	10	51	11	57	05	12	17	53	14	23	20	15	10	11
24	13	57	39	12	51	43	11	52	53	12	32	54	14	53	59	14	53	18
25	13	47	35	12	36	03	11	51	54	12	49	50	14	56	38	14	29	47
26	13	36	38	12	23	44	11	53	32	13	07	31	14	59	45	14	02	41
27	13	24	52	12	14	12	11	57	16	13	24	43	14	53	35	13	35	00
28	13	12	23	12	06	51	12	02	44	13	40	16	14	39	55	13	08	57
29		—		12	01	12	12	09	44	13	53	15	14	21	24	12	46	03
30		—		11	56	54	12	18	15	14	03	01	14	01	48	12	27	03
31		—			—			—		14	09	26	13	40	24	12	12	14

Daily Motion of Mercury & Venus in 1999

Date	January		March		May		July		September		November	
	☿	♀	☿	♀	☿	♀	☿	♀	☿	♀	☿	♀
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	1 24	1 15	1 13	1 14	1 33	1 08	0 49	0 45	1 58	–0 23	0 27	1 01
2	1 25	1 15	1 06	1 14	1 34	1 08	0 45	0 44	1 58	0 20	0 20	1 01
3	1 26	1 15	1 00	1 13	1 36	1 08	0 41	0 43	1 57	0 18	0 13	1 02
4	1 26	1 15	0 51	1 13	1 38	1 08	0 37	0 42	1 57	0 16	+0 05	1 02
5	1 27	1 15	0 43	1 13	1 40	1 08	0 34	0 41	1 56	0 14	–0 03	1 02
6	1 28	1 15	0 35	1 13	1 42	1 07	0 29	0 40	1 56	0 11	0 12	1 02
7	1 28	1 15	0 26	1 13	1 44	1 07	0 25	0 39	1 55	0 08	0 22	1 03
8	1 29	1 15	0 17	1 13	1 46	1 07	0 21	0 38	1 54	0 06	0 32	1 03
9	1 30	1 15	+0 08	1 13	1 48	1 07	0 17	0 36	1 53	0 03	0 41	1 04
10	1 30	1 15	–0 01	1 13	1 50	1 07	0 12	0 35	1 52	–0 02	0 52	1 04
11	1 30	1 15	0 10	1 13	1 52	1 07	0 07	0 34	1 51	+0 01	1 00	1 05
12	1 31	1 15	0 18	1 13	1 53	1 06	+0 03	0 33	1 50	0 04	1 08	1 05
13	1 32	1 15	0 26	1 13	1 55	1 06	–0 03	0 31	1 49	0 06	1 14	1 05
14	1 32	1 15	0 33	1 13	1 57	1 06	0 07	0 30	1 48	0 08	1 19	1 05
15	1 32	1 15	0 40	1 13	1 59	1 06	0 12	0 28	1 47	0 10	1 21	1 06
16	1 33	1 15	0 45	1 13	2 01	1 06	0 17	0 27	1 46	0 12	1 20	1 06
17	1 34	1 15	0 49	1 13	2 03	1 05	0 21	0 25	1 45	0 14	1 16	1 06
18	1 34	1 15	0 53	1 13	2 04	1 05	0 25	0 23	1 44	0 16	1 11	1 06
19	1 34	1 15	0 54	1 13	2 06	1 05	0 30	0 22	1 43	0 18	1 03	1 06
20	1 35	1 15	0 56	1 13	2 07	1 05	0 33	0 20	1 42	0 20	0 53	1 07
21	1 36	1 15	0 55	1 12	2 09	1 04	0 36	0 18	1 40	0 22	0 42	1 07
22	1 36	1 15	0 53	1 12	2 10	1 04	0 39	0 17	1 39	0 24	0 30	1 07
23	1 37	1 15	0 51	1 12	2 11	1 04	0 40	0 14	1 38	0 25	0 19	1 07
24	1 37	1 15	0 47	1 12	2 11	1 04	0 42	0 12	1 37	0 27	–0 08	1 08
25	1 38	1 15	0 44	1 12	2 12	1 03	0 43	0 10	1 36	0 29	+0 04	1 08
26	1 39	1 15	0 39	1 12	2 12	1 03	0 43	0 08	1 35	0 30	0 14	1 08
27	1 39	1 15	0 33	1 12	2 12	1 03	0 42	0 06	1 35	0 32	0 23	1 08
28	1 40	1 15	0 28	1 12	2 11	1 02	0 40	0 04	1 34	0 33	0 32	1 08
29	1 41	1 15	0 22	1 12	2 11	1 02	0 38	+0 01	1 33	0 35	0 40	1 09
30	1 41	1 15	0 17	1 12	2 10	1 02	0 34	–0 01	1 32	0 36	0 46	1 09
31	1 42	1 15	–0 11	1 12	2 09	1 02	–0 29	–0 03				

Date	February		April		June		August		October		December	
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	1 43	1 15	–0 05	1 12	2 07	1 01	–0 27	–0 06	1 31	0 37	0 53	1 09
2	1 43	1 15	+0 01	1 11	2 06	1 01	0 21	0 08	1 30	0 38	0 58	1 09
3	1 44	1 15	0 06	1 11	2 04	1 01	0 16	0 11	1 29	0 40	1 02	1 09
4	1 45	1 15	0 11	1 11	2 02	1 00	0 11	0 13	1 29	0 41	1 07	1 10
5	1 46	1 15	0 17	1 11	2 00	1 00	–0 04	0 15	1 28	0 42	1 10	1 10
6	1 46	1 15	0 21	1 11	1 58	0 59	+0 03	0 17	1 27	0 43	1 13	1 10
7	1 47	1 15	0 25	1 11	1 55	0 59	0 09	0 20	1 26	0 44	1 16	1 10
8	1 48	1 15	0 30	1 11	1 53	0 59	0 15	0 22	1 25	0 45	1 18	1 10
9	1 48	1 15	0 35	1 11	1 51	0 58	0 22	0 24	1 24	0 46	1 19	1 10
10	1 49	1 14	0 39	1 11	1 48	0 58	0 30	0 26	1 23	0 47	1 21	1 10
11	1 49	1 14	0 42	1 11	1 46	0 58	0 36	0 28	1 22	0 48	1 23	1 11
12	1 49	1 14	0 46	1 11	1 43	0 57	0 43	0 30	1 21	0 49	1 24	1 11
13	1 50	1 14	0 49	1 10	1 41	0 56	0 50	0 31	1 20	0 50	1 25	1 11
14	1 50	1 14	0 53	1 10	1 38	0 56	0 56	0 33	1 19	0 51	1 26	1 11
15	1 50	1 14	0 56	1 10	1 36	0 56	1 02	0 34	1 17	0 51	1 27	1 11
16	1 50	1 14	0 59	1 10	1 33	0 55	1 09	0 35	1 16	0 52	1 27	1 11
17	1 50	1 14	1 01	1 10	1 30	0 55	1 14	0 36	1 15	0 52	1 28	1 11
18	1 49	1 14	1 04	1 10	1 28	0 54	1 20	0 37	1 13	0 53	1 29	1 11
19	1 48	1 14	1 07	1 10	1 25	0 53	1 26	0 37	1 11	0 54	1 29	1 11
20	1 46	1 14	1 10	1 10	1 22	0 53	1 30	0 38	1 10	0 54	1 30	1 11
21	1 45	1 14	1 11	1 10	1 19	0 52	1 35	0 37	1 08	0 55	1 30	1 12
22	1 43	1 14	1 14	1 09	1 17	0 52	1 39	0 37	1 05	0 56	1 30	1 12
23	1 40	1 14	1 16	1 09	1 14	0 51	1 43	0 36	1 03	0 56	1 30	1 12
24	1 37	1 14	1 19	1 09	1 11	0 50	1 46	0 36	1 00	0 57	1 31	1 12
25	1 33	1 14	1 20	1 09	1 08	0 50	1 49	0 34	0 58	0 57	1 31	1 12
26	1 30	1 14	1 23	1 09	1 06	0 49	1 52	0 34	0 55	0 58	1 32	1 12
27	1 25	1 14	1 24	1 09	1 02	0 48	1 53	0 32	0 51	0 58	1 32	1 12
28	1 19	1 14	1 27	1 09	0 58	0 47	1 55	0 30	0 47	0 59	1 32	1 12
29	—	—	1 29	1 08	0 56	0 46	1 56	0 28	0 43	0 59	1 33	1 12
30	—	—	1 30	1 08	0 52	0 46	1 57	0 26	0 38	1 00	1 33	1 13
31	—	—	—	—	—	—	1 58	–0 25	0 32	1 00	1 33	1 13

Daily Motion of Sun, Mars, Jupiter and Saturn in 1999

Date	January ☉	♂	♃	♄	March ☉	♂	♃	♄	May ☉	♂	♃	♄	July ☉	♂	♃	♄	September ☉	♂	♃	♄	November ☉	♂	♃	♄
1	61 08	+30	+9	0	60 13	+11	+14	+6	58 14	−22	+14	+8	57 11	+18	+9	+6	58 03	+37	−2	0	1 00	+45	−8	−5
2	61 08	29	9	0	60 11	10	14	6	58 12	22	14	8	57 11	18	9	6	58 04	37	2	0	1 00	45	8	5
3	61 08	29	9	+1	60 09	10	14	6	58 10	22	14	8	57 11	19	9	6	58 07	38	2	0	1 00	45	8	5
4	61 08	29	9	1	60 07	10	14	6	58 08	21	14	8	57 11	20	9	5	58 09	38	2	−1	1 00	45	8	5
5	61 08	29	9	1	60 05	09	14	6	58 08	21	14	8	57 12	20	9	5	58 10	38	2	1	1 00	45	8	5
6	61 08	29	10	1	60 03	08	14	6	58 06	20	14	8	57 12	20	9	5	58 13	38	2	1	1 00	45	8	5
7	61 08	29	10	1	60 03	07	14	6	58 04	20	14	8	57 13	21	9	5	58 14	38	3	1	1 00	45	8	5
8	61 08	28	10	1	60 01	07	14	6	58 03	20	14	8	57 13	22	8	5	58 17	38	3	1	1 00	45	8	5
9	61 09	28	10	1	59 59	06	14	6	58 02	19	14	8	57 13	22	8	5	58 18	39	3	1	1 00	45	7	5
10	61 09	28	10	1	59 57	06	14	6	58 01	19	14	8	57 13	22	8	5	58 19	39	3	1	1 00	45	7	5
11	61 09	28	10	1	59 56	05	14	6	57 49	18	14	8	57 14	23	8	5	58 21	39	3	1	1 00	45	7	5
12	61 09	28	10	2	59 54	04	14	7	57 57	18	13	8	57 14	23	8	5	58 23	39	3	1	1 00	45	7	5
13	61 09	28	10	2	59 53	04	14	7	57 56	17	13	8	57 15	24	8	5	58 25	39	4	2	1 00	45	7	5
14	61 09	27	11	2	59 51	03	14	7	57 55	16	13	8	57 15	24	7	5	58 27	40	4	2	1 00	45	7	5
15	61 08	27	11	2	59 49	02	14	7	57 54	15	13	8	57 15	24	7	4	58 28	40	4	2	1 00	45	7	5
16	61 08	27	11	2	59 46	02	14	7	57 52	15	13	8	57 15	25	7	4	58 30	40	4	2	1 00	46	7	5
17	61 07	27	11	2	59 45	+01	14	7	57 51	14	13	7	57 15	25	7	4	58 32	40	4	2	1 00	46	6	5
18	61 06	27	11	2	59 43	00	14	7	57 49	14	13	7	57 15	26	7	4	58 34	40	5	2	1 01	46	6	5
19	61 06	26	11	2	59 41	−01	14	7	57 46	13	13	7	57 15	26	7	4	58 35	40	5	2	1 01	46	6	5
20	61 05	26	11	2	59 39	02	14	7	57 46	12	13	7	57 16	26	7	4	58 37	40	5	2	1 01	46	6	5
21	61 04	26	11	2	59 37	02	14	7	57 44	11	13	7	57 16	27	7	4	58 38	40	5	2	1 01	46	6	5
22	61 03	26	11	2	59 34	03	15	7	57 42	10	13	7	57 16	27	6	4	58 40	41	5	2	1 01	46	5	5
23	61 02	25	12	3	59 32	04	15	7	57 41	10	13	7	57 16	27	6	4	58 41	41	5	3	1 01	46	5	5
24	61 02	25	12	3	59 30	05	15	7	57 39	09	13	7	57 17	28	6	4	58 43	41	5	3	1 01	46	5	4
25	61 00	25	12	3	59 28	05	15	7	57 38	08	13	7	57 18	28	6	4	58 46	41	6	3	1 01	46	5	4
26	60 59	25	12	3	59 25	06	15	7	57 36	07	13	7	57 18	28	6	4	58 48	41	6	3	1 01	46	5	4
27	60 58	24	12	3	59 22	07	15	7	57 34	06	12	7	57 18	29	5	3	58 50	41	6	3	1 01	46	4	4
28	60 56	24	12	3	59 20	07	15	7	57 34	05	12	7	57 19	29	5	3	58 52	41	7	3	1 01	46	4	4
29	60 55	24	12	3	59 19	08	15	7	57 32	05	12	7	57 20	29	5	3	58 54	41	7	3	1 01	46	4	−4
30	60 55	23	12	3	59 16	09	15	7	57 32	04	12	7	57 20	30	5	3	58 57	41	−7	−3	1 01	+46	−4	
31	60 54	23	12	+4	59 14	−10	15	+7	57 30	−03	+12	+7	57 22	+30	+5	+3								

Date	February ☉	♂	♃	♄	April ☉	♂	♃	♄	June ☉	♂	♃	♄	August ☉	♂	♃	♄	October ☉	♂	♃	♄	December ☉	♂	♃	♄
1	60 52	+23	+12	+4	59 12	−11	+15	+7	57 29	−02	+12	+7	57 23	+30	+5	+3	58 59	+42	−7	−3	1 01	+46	−4	−4
2	60 52	23	13	4	59 10	11	15	7	57 28	01	12	7	57 24	30	4	3	59 01	42	7	3	1 01	46	4	4
3	60 51	22	13	4	59 08	12	15	7	57 27	−01	12	7	57 25	31	4	3	59 04	42	7	3	1 01	46	4	4
4	60 50	22	13	4	59 06	13	15	7	57 27	00	12	7	57 25	31	4	3	59 05	42	7	3	1 01	46	3	4
5	60 48	22	13	4	59 04	14	15	7	57 26	+01	12	7	57 28	31	4	3	59 08	42	7	4	1 01	46	3	4
6	60 48	21	13	4	59 03	14	15	7	57 26	02	12	7	57 29	32	4	2	59 11	42	7	4	1 01	46	3	4
7	60 46	21	13	4	59 01	15	15	7	57 25	03	12	7	57 30	32	4	2	59 13	42	7	4	1 01	46	3	4
8	60 46	21	13	4	58 59	15	15	8	57 24	03	12	7	57 31	32	3	2	59 14	42	7	4	1 01	46	3	4
9	60 45	21	13	4	58 57	16	15	8	57 23	04	12	7	57 33	32	3	2	59 17	42	7	4	1 01	46	3	4
10	60 44	20	13	4	58 56	17	14	8	57 23	05	12	7	57 34	33	3	2	59 19	42	8	4	1 01	46	2	3
11	60 43	20	13	5	58 54	18	14	8	57 22	05	11	7	57 35	33	3	2	59 21	43	8	4	1 01	46	2	3
12	60 42	19	13	5	58 52	18	14	8	57 22	06	11	7	57 36	33	3	2	59 23	43	8	4	1 01	46	2	3
13	60 41	19	13	5	58 50	19	14	8	57 22	07	11	7	57 37	33	2	2	59 25	43	8	4	1 01	46	2	3
14	60 39	18	13	5	58 48	19	14	8	57 21	08	11	7	57 38	34	2	2	59 27	43	8	4	1 01	46	1	3
15	60 38	18	13	5	58 46	20	14	8	57 20	09	11	6	57 39	34	2	2	59 28	43	8	4	1 01	46	1	3
16	60 36	17	13	5	58 44	20	14	8	57 18	09	11	6	57 40	34	2	2	59 30	43	8	4	1 01	46	1	3
17	60 35	17	13	5	58 43	20	14	8	57 18	10	11	6	57 41	34	2	1	59 31	43	8	4	1 01	46	1	3
18	60 33	17	14	5	58 41	21	14	8	57 18	11	11	6	57 42	35	2	1	59 34	43	8	4	1 01	46	−1	3
19	60 32	16	14	5	58 38	21	14	8	57 16	11	11	6	57 44	35	1	1	59 35	43	8	4	1 01	46	0	3
20	60 29	16	14	5	58 36	22	14	8	57 16	12	11	6	57 45	35	1	1	59 37	43	8	4	1 01	46	0	2
21	60 28	15	14	5	58 35	22	14	8	57 15	12	10	6	57 45	35	+1	1	59 39	44	8	4	1 01	46	+1	2
22	60 26	15	14	5	58 31	22	14	8	57 14	13	10	6	57 47	35	0	1	59 41	44	8	5	1 01	46	1	2
23	60 25	14	14	5	58 30	22	14	8	57 14	13	10	6	57 48	36	0	1	59 42	44	8	5	1 01	46	1	2
24	60 22	14	14	5	58 27	22	14	8	57 13	14	10	6	57 49	36	0	1	59 45	44	8	5	1 01	46	1	2
25	60 19	13	14	6	58 25	23	14	8	57 13	15	10	6	57 51	36	0	1	59 46	44	8	5	1 01	46	1	2
26	60 18	13	14	6	58 23	23	14	8	57 12	15	10	6	57 52	36	0	0	59 49	44	8	5	1 01	46	1	2
27	60 17	12	14	6	58 21	23	14	8	57 12	16	10	6	57 54	36	0	0	59 49	44	8	5	1 01	46	1	2
28	60 14	+12	+14	+6	58 19	23	14	8	57 11	16	10	6	57 55	37	0	0	59 53	44	8	5	1 01	46	2	2
29	—	—	—	—	58 17	22	14	8	57 11	17	10	6	57 57	37	−1	0	59 56	44	8	5	1 01	46	2	2
30	—	—	—	—	58 16	−22	+14	+8	57 12	+17	+10	+6	57 58	37	1	0	59 57	44	8	5	1 01	46	2	1
31	—	—	—	—	—	—	—	—	—	—	—	—	58 00	+37	−1	0	59 59	44	−8	−5	1 01	+46	+2	−1

Entrance of Sun (☉) into Nakshatras, 1999

The timings of Sun's entry into different *nakshatra*-divisions are given below in I.S.T.

	Nakshatra		*d*	*h*	*m*		*Nakshatra*		*d*	*h*	*m*
21	Uttarasada	Jan.	11	10	30	7	Punarvasu	July	6	13	53
0	*Enters Abhijit* *		21	6	06	8	Pusya		20	13	21
22	Sravana		24	12	43	9	Aslesa	Aug.	3	12	20
0	*Leaves Abhijit* *		25	9	42	10	Magha		17	9	57
23	Dhanistha	Feb.	6	15	57	11	Purvaphalguni		31	6	00
24	Satabhisaj		19	20	23	12	Uttarphalguni	Sept.	13	23	49
25	Purvabhadrapada	Mar.	4	26	44	13	Hasta		27	15	22
26	Uttarabhadrapada		18	11	08	14	Citra	Oct.	10	28	20
27	Revati		31	21	57	15	Svati		24	14	50
1	Asvini	Apr.	14	11	16	16	Vishakha	Nov.	6	22	59
2	Bharani		27	27	02	17	Anuradha		19	28	58
3	Krittika	May	11	21	14	18	Jyestha	Dec.	3	9	20
4	Rohini		25	17	22	19	Mula		16	12	15
5	Mrigasiras	June	8	15	18	20	Purvasada		29	14	34
6	Ardra		22	14	13	21	Uttarasada	Jan. 2000 A.D.	11	16	28

* The ancient *Abhijit* nakshatra extends from $9^{s}\,6^{\circ}\,40'\,00''$ to $9^{s}\,10^{\circ}\,53'\,20''$

Entrance of Moon (☽) into Nirayana Sings *(Rasis)*, 1999

Enters :-		*d*	*h*	*m*		*d*	*h*	*m*		*d*	*h*	*m*		*d*	*h*	*m*		*d*	*h*	*m*
0 Mesha					Mar.	19	20	39	June	9	27	06	Aug.	30	21	42	Nov.	20	25	52
1 Vrisha						21	21	27		11	27	34	Sept.	1	24	32		22	26	03
2 Mithuna						23	23	31		13	26	57		3	27	13		24	25	14
3 Karkata	Jan.	3	5	30		25	27	50		15	27	23		6	6	23		26	25	35
4 Simha		5	10	04		28	10	34		18	6	42		8	10	34	Nov.	28	28	46
5 Kanya		7	18	22	Mar.	30	19	25		20	13	53		10	16	26	Dec.	1	11	24
6 Tula		10	5	52	Apr.	2	6	04		22	24	30		12	24	45		3	21	00
7 Vrishcika		12	18	31		4	18	11		25	12	54		15	11	44		6	8	35
8 Dhanus		15	6	02		7	6	48		27	25	24		17	24	18		8	21	14
9 Makara		17	15	14		9	18	06	June	30	12	50		20	12	10		11	10	06
10 Kumbha		19	22	08		11	26	06	July	2	22	31		22	21	08		13	21	51
11 Mina		21	27	12		14	6	03		5	5	51		24	26	30		16	6	48
0 Mesha		24	6	54		16	6	50		7	10	25		26	29	09		18	11	52
1 Vrisha		26	9	38		18	6	21		9	12	28	Sept.	29	6	41		20	13	20
2 Mithuna		28	12	03		20	6	45		11	13	02	Oct.	1	8	38		22	12	44
3 Karkata	Jan.	30	15	06		22	9	43		13	13	45		3	11	59		24	12	08
4 Simha	Feb.	1	19	57		24	16	02		15	16	23		5	17	04		26	13	33
5 Kanya		3	27	37		26	25	15		17	22	18		7	23	54		28	18	25
6 Tula		6	14	16	Apr.	29	12	25		20	7	50		10	8	38	Dec.	30	27	06
7 Vrishcika		8	26	43	May	1	24	40		22	19	52		12	19	30	Jan.	2	14	37
8 Dhanus		11	14	38		4	13	18		25	8	21		15	8	04	(2000)	4	27	25
9 Makara		13	24	03		6	25	09		27	19	31		17	20	36		7	16	04
10 Kumbha		16	6	21		9	10	28	July	29	28	33		20	6	38		9	27	32
11 Mina		18	10	10		11	15	55	Aug.	1	11	19		22	12	37		12	12	54
0 Mesha		20	12	40		13	17	36		3	16	03		24	14	55		14	19	22
1 Vrisha		22	15	00		15	16	59		5	19	08		26	15	13		16	22	44
2 Mithuna		24	18	02		17	16	16		7	21	10		28	15	34		18	23	40
3 Karkata		26	22	19		19	17	35		9	23	05	Oct.	30	17	42		20	23	37
4 Simha		28	28	16		21	22	26		11	26	08	Nov.	1	22	28		22	24	22
5 Kanya	Mar.	3	12	17		24	7	00		14	7	33		4	5	49		24	27	42
6 Tula		5	22	38		26	18	14		16	16	10		6	15	16		27	10	46
7 Vrishcika		8	10	49		29	6	41		18	27	37		8	26	26	Jan.	29	21	27
8 Dhanus		10	23	11	May	31	19	14		21	16	10		11	14	59	Feb.	1	10	10
9 Makara		13	9	29	June	3	7	02		23	27	28		13	27	54		3	22	47
10 Kumbha		15	16	14		5	16	58		26	12	05		16	15	07	Feb.	6	9	43
11 Mina	Mar.	17	19	30	June	7	23	49	Aug.	28	17	54	Nov.	18	22	37	(2000)	8	18	27

Entrance of Planets into *Nirayana* Signs *(Rasis)* during 1999

MERCURY

Enters :-			*d*	*h*	*m*	*Enters :-*				*d*	*h*	*m*
Dhanus	on	Jan.	2	25	17	Karkata	on		June	21	18	31
Makara	"	Jan.	22	19	58	Simha	"		Aug.	28	16	44
Kumbha	"	Feb.	9	11	29	Kanya	"		Sept.	13	7	56
Mina	"	Feb.	26	10	49	Tula	"		Oct	1	7	58
Kumbha **R**	"	Mar.	25	16	52	Vrischika	"		Oct	23	20	54
Mina	"	Apr.	10	24	44	Tula **R**	"		Nov.	15	14	03
Mesha	"	May	5	12	51	Vrischika	"		Dec.	6	13	55
Virsha	"	May	21	6	26	Dhanus	"		Dec.	27	12	30
Mithuna	"	June	3	27	56	Makara	"	2000 A.D.	Jan.	15	11	11

VENUS

Enters :-			*d*	*h*	*m*	*Enters :-*			*d*	*h*	*m*
Kumbha	on	Jan.	23	23	17	Simha	on	July	2	28	48
Mina	"	Feb.	16	26	38	Karkata **R**	"	Aug.	25	23	42
Mesha	"	Mar	13	13	39	Simha	"	Sept.	28	9	54
Vrisha	"	Apr.	7	13	27	Kanya	"	Nov.	3	10	06
Mithuna	"	May	3	10	29	Tula	"	Nov.	30	20	31
Karkata	"	May	30	25	08	Vrischika	"	Dec.	26	7	53

MARS

Enters :-			*d*	*h*	*m*	*Enters :-*				*d*	*h*	*m*
Tula	on	Jan.	12	14	47	Makara	on		Nov.	18	10	43
Vrischika	"	Aug.	23	22	41	Kumbha	"		Dec.	27	10	18
Dhanus	"	Oct.	8	16	24	Mina	"	2000 A.D.	Feb.	4	5	47

JUPITER

Enters :-			*d*	*h*	*m*	*Enters :-*			*d*	*h*	*m*
Mina	on	Jan.	12	27	20	Mesha	on	May	26	16	32

SATURN

Remains in Mesha Rasi during the year

URANUS remains in Makara Rasi during the year
NEPTUNE remains in Makara Rasi during the year
PLUTO remains in Vrischika Rasi during the year
RAHU (True) remains in Karkata Rasi during the year
KETU(True) remains in Makara Rasi during the year
RAHU (Mean) enters Karkata (**R**) Rasi on Jan. 11,17*h* 19*m*
KETU (Mean) enters Makara (**R**) Rasi on Jan. 11, 17*h* 19 *m*

NAVAMSAS — Navamsa Signs and their Lords

Sign	1st 0° 0' to 3° 20'	2nd 3° 20' to 6° 40'	3rd 6° 40' to 10° 0'	4th 10° 0' to 13° 20'	5th 13° 20' to 16°40'	6th 16° 40' to 20° 0'	7th 20° 0' to 23° 20'	8th 23° 20' to 26° 40'	9th 26° 40' to 30° 0'
0 Mesha	0 ♂	1 ♀	2 ☿	3 ☽	4 ☉	5 ☿	6 ♀	7 ♂	8 ♃
1 Vrisha	9 ♄	10 ♄	11 ♃	0 ♂	1 ♀	2 ☿	3 ☽	4 ☉	5 ☿
2 Mithuna	6 ♀	7 ♂	8 ♃	9 ♄	10 ♄	11 ♃	0 ♂	1 ♀	2 ☿
3 Karkata	3 ☽	4 ☉	5 ☿	6 ♀	7 ♂	8 ♃	9 ♄	10 ♄	11 ♃
4 Simha	0 ♂	1 ♀	2 ☿	3 ☽	4 ☉	5 ☿	6 ♀	7 ♂	8 ♃
5 Kanya	9 ♄	10 ♄	11 ♃	0 ♂	1 ♀	2 ☿	3 ☽	4 ☉	5 ☿
6 Tula	6 ♀	7 ♂	8 ♃	9 ♄	10 ♄	11 ♃	0 ♂	1 ♀	2 ☿
7 Vriscika	3 ☽	4 ☉	5 ☿	6 ♀	7 ♂	8 ♃	9 ♄	10 ♄	11 ♃
8 Dhuanus	0 ♂	1 ♀	2 ☿	3 ☽	4 ☉	5 ☿	6 ♀	7 ♂	8 ♃
9 Makara	9 ♄	10 ♄	11 ♃	0 ♂	1 ♀	2 ☿	3 ☽	4 ☉	5 ☿
10 Kumbha	6 ♀	7 ♂	8 ♃	9 ♄	10 ♄	11 ♃	0 ♂	1 ♀	2 ☿
11 Mina	3 ☽	4 ☉	5 ☿	6 ♀	7 ♂	8 ♃	9 ♄	10 ♄	11 ♃

The figure 0 means that the Navamsa falls in the sign (*Rasi*) of Mesha, etc.
The Lords of the Navamsa signs are indicated by the planetary symbols.

Entrance of Planets into Nakshatras, 1999

Naks.	Date and Time	d	h	m
	MERCURY			
19	Jan.	2	25	17
20		11	27	05
21		20	17	49
22		28	22	43
23	Feb.	5	17	34
24		12	27	38
25		20	11	13
26		28	19	26
25 R	Mar.	21	17	26
26	Apr.	15	6	16
27		26	18	29
1	May	5	12	51
2		12	24	36
3		19	16	33
4		25	21	01
5		31	23	43
6	June	7	12	12
7		14	23	52
8		24	9	49
9	Aug.	20	27	04
10		28	16	44
11	Sept.	4	12	43
12		11	12	25
13		18	23	31
14		26	25	09
15	Oct.	5	19	13
16		15	10	37
17		27	7	31
16 R	Nov.	12	23	10
17	Dec.	8	29	20
18		18	15	58
19	Dec.	27	12	30

Naks.	Date and Time	d	h	m
	VENUS			
22	Jan.	7	23	30
23		18	15	13
24		29	7	34
25	Feb.	8	24	54
26		19	19	23
27	Mar.	2	15	29
1		13	13	39
2		24	14	13
3	Apr.	4	17	57
4		15	25	30
5		27	13	55
6	May	9	8	59
7		21	13	09
8	June	3	7	29
9		16	26	22
10	July	2	28	48
9 R	Aug.	25	23	42
10	Sept.	28	9	54
11	Oct.	16	21	05
12		30	27	00
13	Nov.	12	22	18
14		24	24	00
15	Dec.	6	14	53
16		17	22	55
17	Dec.	28	26	25
18	Jan. (2000)	8	26	42
	MARS			
15	Jan.	27	23	17
14 R	May	4	16	07
15	July	6	21	59
16	Aug.	5	26	13

Naks.	Date and Time	d	h	m
	MARS (contd)			
17	Aug.	29	11	31
18	Sept.	19	7	08
19	Oct.	8	16	24
20	Oct.	26	27	50
21	Nov.	13	25	03
22	Dec.	1	13	07
23	Dec.	18	19	50
	JUPITER			
26	Jan.	30	21	11
27	Mar.	29	27	40
1	May	26	16	32
	SATURN			
2	Apr.	30	24	16
	URANUS			
	Remains in 22 N			
	NEPTUNE			
22	Mar.	23	24	51
21 R	June	21	22	51
	PLUTO			
18	Dec.	7	18	41
	RAHU (True)			
8 R	Oct.	11	8	29
	KETU (True)			
22 R	May	13	7	49
	RAHU (Mean)			
9 R	Jan.	11	17	19
8 R	Sept.	20	7	58
	KETU (Mean)			
22 R	May	17	12	38

Beginning of Nakshatra Division & Vimsottari Dasa

Nakshatra	Long. °	'	"	Vimsottari Dasa	years	Nakshatra	Long. °	'	"	Vimsottari Dasa	years
1 Asvini	0	0	00	Ketu	7	15 Svati	6	6	40	Rahu	18
2 Bharani	0	13	20	Venus	20	16 Visakha	6	20	00	Jupiter	16
3 Krittika	0	26	40	Sun	6	17 Anuradha	7	3	20	Saturn	19
4 Rohini	1	10	00	Moon	10	18 Jyestha	7	16	40	Mercury	17
5 Mrigairas	1	23	20	Mars	7	19 Mula	8	0	00	Ketu	7
6 Ardra	2	6	40	Rahu	18	20 Purvasadha	8	13	20	Venus	20
7 Punarvasu	2	20	00	Jupiter	16	21 Uttarasadha	8	26	40	Sun	6
8 Pusya	3	3	20	Saturn	19	22 Sravana	9	10	00	Moon	10
9 Aslesa	3	16	40	Mercury	17	23 Dhanistha	9	23	20	Mars	7
10 Magha	4	0	00	Ketu	7	24 Satabhisaj	10	6	40	Rahu	18
11 P.Phalguni	4	13	20	Venus	20	25 P.Bhadrapada	10	20	00	Jupiter	16
12 U.Phalguni	4	26	40	Sun	6	26 U.Bhadrapada	11	3	20	Saturn	19
13 Hasta	5	10	00	Moon	10	27 Revati	11	16	40	Mercury	17
14 Citra	5	23	20	Mars	7	1 Asvini	12	0	00	Ketu	7

The ancient *Abhijit* nakshatra extends from 9^s 6° 40' 0" to 9^s 10° 53' 20"

Conjunctions and Oppositions of Planets with Sun, 1999 (in Longitude)

Planet	Conjunction							Opposition (inferior conjunction in case of Mercury and Venus)						
	Date				Long.(D)			Date				Long.(R)		
		d	h	m	s	°	'		d	h	m	s	°	'
Mercury	Feb.	4	10	48	9	21	05	Mar.	19	24	43	11	04	54
	May	25	23	51	1	10	16	July	26	21	19	3	9	22
	Sept.	8	20	31	4	21	38	Nov.	15	27	34	6	29	14
Venus		—				—		Aug.	20	17	28	4	3	11
Mars		—				—		Apr.	24	23	07	6	10	15
Juptier	Apr.	1	11	40	11	17	14	Oct.	23	24	34	0	6	05
Saturn	Apr.	27	16	34	0	12	55	Nov.	6	19	23	0	19	51
Uranus	Feb.	2	7	29	9	18	55	Aug.	7	24	08	9	20	58
Neptune	Jan.	22	13	53	9	8	01	July	26	15	03	9	9	08
Pluto	Dec.	2	29	07	7	16	29	May	31	5	35	7	15	17

* Inferior conjuction occurs in case of inferior planets *viz.* Mercury and Venus, while they are retrograde and coming between the Sun and the Earth.

Heliacal Settings or Combustion of Planets

(Calculated for the Central Station of India 23° 11' North latitude)

Planet	Inferior Planets (Retrograde) and Superior Planets (Direct)			Inferior Planets (Direct)		
	Sets in the East (Western horizon)	Rises in the West (Eastern horizon)	Period	Sets in the West (Eastern horizon)	Rises in the East (Western horizon)	Period
	d h m	d h m	d	d h m	d h m	d
Mercury	(98) Nov. 25, 13 13	Dec. 6, 17 47	11	Jan. 15, 12 52	Feb. 16, 27 10	32
	Mar. 13, 15 22	Mar. 27, 24 19	14	May 11, 22 06	June 3, 10 27	23
	July 15, 9 22	Aug. 3, 25 46	19	Aug. 29, 16 26	Sept. 27, 27 02	29
	Nov. 8, 14 28	Nov. 20, 28 30	12	Dec. 27, 19 17	Jan. 30 23 58 (2000 A.D.)	34
Venus	Aug. 10 24 42	Aug. 24, 22 46	14	—	—	—
Mars	—	—	—	—	—	—
Jupiter	Mar. 20, 27 26	Apr. 19, 13 53	30	—	—	—
Saturn	Apr. 13, 7 51	May 19, ,8 59	36	--	—	—

N.B. Here Western horizon means East of the Sun and Eastern Horizon means West of the Sun.

The planets Mercury and Venus are regarded as inferior planets, while Mars, Jupiter, Saturn etc. as superior planets.

Retrogression of Planets, 1999

Planet	Retrograde							Direct							Retrogression		
	Date				Nirayana Long.			Date				Nirayana Long.			Time	Arc	
			h	m	s	°	'		d	h	m	s	°	'	d	°	'
Mercury	Mar.	10	14	44	11	10	12	Apr.	2	14	53	10	27	02	23	13	10
	July	12	29	02	3	15	39	Aug.	6	8	49	3	4	44	24	10	55
	Nov.	5	8	12	7	7	52	Nov.	25	9	37	6	21	47	20	16	05
Venus	July	30	7	09	4	11	17	Sept.	11	5	57	3	24	56	43	16	21
Mars	Mar.	18	19	10	6	18	22	June	4	11	41	6	0	36	78	17	46
Jupiter	Aug.	25	8	05	0	11	08	Dec.	20	20	20	0	1	09	117	9	59
Saturn	Aug.	30	6	59	0	23	20	Jan.(2000)	12	10	28	0	16	26	135	6	54
Uranus	May	21	27	53	9	22	57	Oct.	23	11	53	9	19	01	155	3	56
Neptune	May	7	6	41	9	10	28	Oct.	14	7	12	9	7	44	160	2	44
Pluto	Mar.	13	26	37	7	16	39	Aug.	19	7	12	7	13	53	159	2	46

Rising and Setting of Planets in I.S.T., 1999
at **CHENNAI** (Latitude 13° N 04')

Date	Sun rise (Upper Limb)	Sun set (Upper Limb)	Mercury Rise	Mercury Set	Venus Rise	Venus Set	Mars Rise	Mars Set	Jupiter Rise	Jupiter Set	Saturn Rise	Saturn Set
	h m	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*
Jan. 1	6 31	17 53	5 13	16 29	7 41	18 57	0 44	12 34	11 04	22 56	13 01	1 17
11	6 35	17 59	5 39	16 51	7 51	19 13	0 24	12 10	10 28	22 22	12 22	0 38
21	6 36	18 04	6 07	17 19	7 59	19 27	0 03	11 47	9 56	21 50	11 44	0 00
31	6 36	18 09	6 33	17 53	8 03	19 41	23 40	11 22	9 22	21 18	11 07	23 23
Feb. 10	6 34	18 13	6 58	18 30	8 06	19 52	23 17	10 55	8 50	20 48	10 29	22 45
20	6 30	18 16	7 19	19 05	8 07	20 03	22 50	10 26	8 17	20 17	9 53	22 00
Mar. 2	6 25	18 18	7 24	19 26	8 07	20 13	22 19	9 55	7 45	19 47	9 16	21 34
12	6 19	18 19	6 55	19 03	8 07	20 23	21 46	9 20	7 15	19 17	8 40	20 58
22	6 12	18 20	5 52	17 56	8 08	20 34	21 08	8 42	6 43	18 47	8 05	20 23
Apr. 1	6 06	18 20	5 01	16 55	8 11	20 45	20 24	7 58	6 12	18 18	7 30	19 50
11	5 59	18 21	4 38	16 30	8 17	20 57	19 35	7 11	5 40	17 48	6 55	18 15
21	5 54	18 22	4 32	16 31	8 23	21 09	18 41	6 19	5 09	17 19	6 20	18 42
May 1	5 49	18 24	4 38	16 46	8 32	21 22	17 40	5 20	4 37	16 49	5 46	18 08
11	5 45	18 26	4 54	17 16	8 41	21 33	16 49	4 27	4 05	16 19	5 11	17 33
21	5 43	18 29	5 25	18 01	8 51	21 41	15 58	3 00	3 34	15 48	4 36	17 00
31	5 42	18 32	6 11	18 59	8 59	21 47	15 15	2 55	3 02	15 18	4 01	16 25
June 10	5 42	18 35	6 58	19 48	9 04	21 46	14 34	2 16	2 29	14 47	3 26	15 50
20	5 44	18 37	7 31	20 17	9 05	21 41	14 01	1 41	1 56	14 14	2 50	15 16
30	5 46	18 39	7 42	20 20	9 01	21 29	13 32	1 10	1 22	13 42	2 14	14 40
July 10	5 49	18 40	7 26	19 56	8 49	21 11	12 07	0 41	0 48	13 08	1 38	14 04
20	5 52	18 39	6 40	19 06	8 28	20 44	12 44	0 16	0 13	12 35	1 02	13 28
30	5 54	18 37	5 33	18 03	7 54	20 06	12 31	23 59	23 37	11 59	0 24	12 52
Aug. 9	5 56	18 33	4 46	17 20	7 06	19 14	12 05	23 31	23 01	11 23	23 47	12 15
19	5 57	18 28	4 44	17 21	6 05	18 13	11 52	23 14	22 23	10 45	23 09	11 37
29	5 58	18 22	5 19	17 47	5 02	17 14	11 40	22 58	21 44	10 06	22 30	10 58
Sept. 8	5 58	18 15	6 01	18 15	4 10	16 26	11 27	22 43	21 04	9 25	21 49	10 17
18	5 58	18 08	6 35	18 35	3 35	15 53	11 17	22 31	20 22	8 44	21 10	9 38
28	5 58	18 01	7 01	18 47	3 13	15 31	11 08	22 20	19 40	8 00	20 29	8 55
Oct. 8	5 59	17 54	7 22	18 56	3 02	15 18	11 00	22 10	18 56	7 16	19 48	8 14
18	6 00	17 49	7 41	19 03	2 56	15 10	10 52	22 02	18 12	6 32	19 06	7 32
28	6 02	17 44	7 47	19 02	2 55	15 05	10 45	21 55	17 25	5 43	18 24	6 50
Nov. 7	6 05	17 41	7 23	18 37	2 58	15 00	10 37	21 49	16 40	4 58	17 38	6 04
17	6 09	17 39	5 58	17 24	3 52	14 59	10 29	21 43	15 58	4 14	16 56	5 20
27	6 13	17 39	4 57	16 41	3 08	14 58	10 20	21 38	15 15	3 31	16 14	4 38
Dec. 7	6 19	17 42	4 55	16 23	3 16	14 59	10 10	21 32	14 33	2 49	15 32	3 56
17	6 24	17 46	5 16	16 36	3 26	15 00	10 00	21 26	13 53	2 09	14 51	3 15
27	6 29	17 51	5 44	16 58	3 38	15 06	9 48	21 20	13 14	1 30	14 10	2 34
32	6 31	17 53	5 58	17 10	3 44	15 08	9 42	21 16	12 54	1 10	13 50	2 14

Visibility of Planets in Morning and Evening Twilight
(Dates are approximate)

	Morning	Evening	Heliacal Setting	
Mercury	Jan. 1 – Jan. 14	Feb. 17 – Mar. 12	Jan. 15 – Feb. 16	Aug. 29 – Sept. 27
	Mar. 28 – May 10	June 4 – July 14	Mar. 13 – Mar. 27	Nov. 8 – Nov. 20
	Aug. 4 – Aug. 28	Sept. 28 – Nov. 7	May 11 – June 3	Dec. 27 – Jan. 30
	Nov. 21 – Dec. 26	—	July 15 – Aug. 3	—

Rising and Setting of Planets in I.S.T., 1999
at **MUMBAI** (Latitude 18° N 59')

Date	Sun rise (Upper Limb)	Sun set (Upper Limb)	Mercury Rise	Mercury Set	Venus Rise	Venus Set	Mars Rise	Mars Set	Jupiter Rise	Jupiter Set	Saturn Rise	Saturn Set
	h m	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*
Jan. 1	7 12	18 12	5 53	16 49	8 22	19 18	1 16	13 02	11 36	23 24	13 28	1 50
11	7 15	18 19	6 20	17 10	8 30	19 34	0 57	12 37	11 00	22 50	12 49	1 11
21	7 15	18 25	6 47	17 39	8 36	19 50	0 36	12 14	10 26	22 20	12 11	0 33
31	7 13	18 31	7 12	18 14	8 39	20 05	0 15	11 47	9 53	21 47	11 34	23 56
Feb. 10	7 10	18 36	7 35	18 53	8 39	20 19	23 51	11 21	9 21	21 17	10 55	23 19
20	7 05	18 41	7 52	19 32	8 37	20 33	23 25	10 51	8 48	20 46	10 18	22 44
Mar. 2	6 58	18 44	7 54	18 56	8 36	20 44	22 55	10 19	8 15	20 17	9 42	22 08
12	6 50	18 47	7 23	18 35	8 34	20 56	22 22	9 44	7 45	19 47	9 06	21 32
22	6 42	18 50	6 22	18 26	8 33	21 09	21 44	9 06	7 12	19 18	8 30	20 58
Apr. 1	6 33	18 52	5 32	17 24	8 33	21 23	20 59	8 23	6 41	18 49	7 56	20 24
11	6 25	18 55	5 09	16 59	8 37	21 37	20 10	8 36	6 08	18 20	7 20	19 50
21	6 18	18 57	5 02	17 00	8 42	21 50	19 17	6 43	5 37	17 51	6 45	19 17
May 1	6 11	19 01	5 06	17 18	8 50	22 04	18 15	5 45	5 05	17 21	6 10	18 44
11	6 06	19 04	5 20	17 50	8 58	22 16	17 22	4 54	4 32	16 52	5 35	18 09
21	6 03	19 08	5 47	18 39	9 08	22 24	16 42	4 16	4 01	16 21	5 01	17 35
31	6 01	19 12	6 30	18 40	9 18	22 28	15 48	3 22	3 29	15 51	5 25	18 01
June 10	6 01	19 15	7 16	20 30	9 24	22 26	15 12	2 38	2 55	15 21	3 50	16 26
20	6 02	19 18	7 50	20 58	9 27	22 19	14 36	2 06	2 21	14 49	3 14	15 52
30	6 05	19 20	8 03	20 59	9 24	22 06	14 06	1 36	1 48	14 16	2 37	15 17
July 10	6 08	19 20	7 48	20 34	9 14	21 46	13 42	1 06	1 13	13 43	2 01	14 41
20	6 11	19 18	7 03	19 43	8 54	21 18	13 20	0 40	0 39	13 09	1 25	14 05
30	6 15	19 15	5 57	18 39	8 23	20 37	13 08	0 22	0 02	12 34	0 48	13 28
Aug. 9	6 18	19 10	5 08	17 58	7 34	19 46	12 44	23 52	23 25	11 59	0 11	12 51
19	6 21	19 04	5 06	17 58	6 32	18 46	12 31	23 35	22 47	11 21	23 33	12 13
29	6 23	18 56	5 43	18 23	5 30	17 46	12 19	23 19	22 08	10 42	22 54	11 34
Sept. 8	6 25	18 47	6 28	18 48	4 37	16 59	12 07	23 03	21 28	10 00	22 13	10 53
18	6 27	18 39	7 05	18 05	4 01	16 27	11 58	22 50	20 48	9 18	21 34	10 14
28	6 29	18 30	7 34	19 14	3 39	16 05	11 50	22 38	20 05	8 35	20 52	9 32
Oct. 8	6 31	18 21	7 59	19 19	3 27	15 53	11 42	22 28	19 22	7 50	20 11	8 51
18	6 34	18 14	8 19	19 25	3 23	15 43	11 34	22 20	18 38	7 06	19 29	8 09
28	6 37	18 08	8 27	19 23	3 24	15 36	11 27	22 13	17 50	6 18	18 48	7 16
Nov. 7	6 42	18 03	8 02	18 58	3 27	15 31	11 18	22 08	17 05	5 33	18 02	6 40
17	6 47	18 00	6 36	17 46	3 33	15 27	11 10	22 02	16 23	4 49	17 20	5 56
27	6 53	17 59	6 34	16 54	3 40	15 26	11 00	21 58	15 41	4 05	16 38	5 14
Dec. 7	6 59	18 01	5 33	16 45	3 50	15 24	10 49	21 53	15 00	3 22	15 56	4 32
17	7 05	18 04	5 56	16 56	4 02	15 24	10 37	21 49	14 20	2 42	15 15	3 51
27	7 10	18 09	6 25	17 17	4 15	15 29	10 24	21 44	13 41	2 03	14 35	3 09
32	7 12	18 12	6 39	17 29	4 22	15 30	10 17	21 41	13 20	1 44	14 15	2 49

Visibility of Planets in Morning and Evening Twilight
(Dates are approximate)

	Morning	Evening	Heliacal Setting
Venus	Aug. 25 – Dec. 31	Jan. 1 – Aug. 9	Aug. 10 – Aug. 24
Mars	Jan. 1 – Apr. 24	Apr. 25 – Dec. 31	—

Note : Twilight is the period of time preceding sunrise and following sunset during which the sky is partially illuminated.

Rising and Setting of Planets in I.S.T., 1999
at **CALCUTTA** (Latitude 22° N 35')

Date	Sun rise	Sun set	Mercury		Venus		Mars		Jupiter		Saturn	
	Upper Limb		Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Jan. 1	6 17	17 03	4 57	15 39	7 25	18 07	0 15	11 57	10 34	22 20	12 23	0 49
11	6 19	17 10	5 23	16 01	7 34	18 24	23 56	11 32	9 58	21 46	11 44	0 10
21	6 19	17 17	5 43	16 37	7 37	18 43	23 36	11 08	9 25	21 15	11 06	23 32
31	6 16	17 24	6 15	17 05	7 39	18 59	23 15	10 41	8 50	21 44	10 28	22 56
Feb. 10	6 12	17 30	6 37	17 45	7 38	19 14	22 52	10 14	8 18	20 14	9 50	22 18
20	6 05	17 35	6 51	18 27	7 35	19 29	22 26	9 44	7 45	19 43	9 13	21 43
Mar. 2	5 58	17 40	6 50	18 54	7 33	19 41	21 56	9 12	7 12	19 14	8 36	20 08
12	5 49	17 44	6 19	17 33	7 28	19 56	21 22	8 38	6 41	18 45	8 00	20 32
22	5 40	17 48	5 18	17 38	7 26	20 10	20 45	7 59	6 08	18 16	7 24	19 58
Apr. 1	5 31	17 51	4 30	16 20	7 25	20 25	20 00	7 16	5 36	17 48	6 50	19 21
11	5 21	17 55	4 08	15 54	7 27	20 41	19 11	6 29	5 04	17 18	6 13	18 51
21	5 12	17 59	4 00	15 56	7 32	20 54	18 17	5 37	4 32	16 50	5 39	18 17
May 1	5 05	18 03	4 02	16 16	7 39	21 09	18 16	4 38	3 59	16 51	5 04	17 44
11	4 59	18 07	4 13	16 51	7 49	21 19	16 22	3 48	3 27	15 51	4 29	17 09
21	4 54	18 12	4 38	17 42	7 58	21 28	15 32	3 00	2 56	15 20	3 53	16 37
31	4 52	18 16	5 19	18 45	8 07	21 33	14 48	2 16	2 23	14 51	3 18	16 02
June 10	4 52	18 20	6 05	19 35	8 15	21 29	14 09	1 35	1 49	14 21	2 43	15 27
20	4 53	18 23	6 40	20 02	8 18	21 22	13 37	0 59	1 15	13 49	2 07	14 53
30	4 55	18 25	6 55	20 01	8 16	21 08	13 08	0 28	0 42	13 16	1 30	14 18
July 10	4 59	18 25	6 42	19 34	8 08	20 46	12 43	23 59	0 07	12 43	0 54	13 42
20	5 03	18 23	5 56	18 44	7 49	20 17	12 23	23 31	23 32	12 10	0 18	13 06
30	5 07	18 19	4 49	17 41	7 18	19 33	12 04	23 08	22 55	11 35	23 41	12 29
Aug. 9	5 11	18 12	4 00	17 00	6 30	18 44	11 46	22 44	22 09	10 59	23 03	11 53
19	5 15	18 05	3 58	17 00	5 29	16 43	11 33	22 27	21 41	10 21	22 25	11 15
29	5 18	17 57	4 36	17 24	4 24	16 46	11 23	22 09	21 03	9 41	21 46	10 36
Sept. 8	5 21	17 47	5 23	17 47	3 32	15 58	11 11	21 53	20 22	9 09	21 04	9 56
18	5 24	17 37	6 03	18.01	2 55	15 27	11 02	21 40	19 41	8 19	20 25	9 17
28	5 27	17 27	6 33	18 09	2 33	15 05	10 54	21 28	18 58	7 36	19 45	8 33
Oct. 8	5 30	17 18	7 00	18 12	2 22	14 52	10 47	21 17	18 15	6 51	19 04	7 52
18	5 34	17 09	7 22	18 16	2 18	14 42	10 39	21 09	17 32	6 06	18 22	7 10
28	5 39	17 02	7 31	18 13	2 19	14 35	10 30	21 04	16 45	5 17	17 41	6 27
Nov. 7	5 44	16 56	7 07	17 47	2 23	14 29	10 23	20 57	16 01	4 31	16 55	5 41
17	5 50	16 52	5 38	16 38	2 30	14 24	10 14	20 52	15 18	3 48	16 13	4 57
27	5 57	16 51	4 35	15 47	2 39	14 21	10 14	20 58	14 36	3 04	15 31	4 15
Dec. 7	6 04	16 52	4 35	15 37	2 50	14 18	9 52	20 44	13 54	2 22	14 49	3 33
17	6 10	16 55	5 00	15 46	3 03	14 17	9 40	20 40	13 14	1 42	14 08	2 52
27	6 15	17 00	5 30	16 06	3 17	14 21	9 25	20 37	12 35	1 03	13 27	2 11
32	6 17	17 03	5 44	16 18	3 25	14 21	9 18	20 38	12 14	0 44	13 07	1 51

Visibility of Planets in Morning and Evening Twilight
(Dates are approximate)

	Morning	Evening	Heliacal Setting
Jupiter	Apr. 19 — Oct. 23	Jan. 1 — Mar. 19 Oct. 23 — Dec. 31	Mar. 20 — Apr. 18

Note : The planets remain invisible to the naked eye during the period of combustion or heliacal settings.

Rising and Setting of Planets in I.S.T., 1999

at **DELHI** (Latitude 28° N 39')

Date	Sun rise (Upper Limb)	Sun set (Upper Limb)	Mercury Rise	Mercury Set	Venus Rise	Venus Set	Mars Rise	Mars Set	Jupiter Rise	Jupiter Set	Saturn Rise	Saturn Set
	h m	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*
Jan. 1	7 14	17 35	5 55	16 11	8 23	18 39	1 03	12 39	11 21	23 03	13 03	1 39
11	7 16	17 42	6 23	16 31	8 28	19 01	0 45	12 13	10 44	22 30	12 24	1 00
21	7 14	17 50	6 49	17 01	8 31	19 19	0 26	11 50	10 12	21 58	11 46	0 22
31	7 10	17 59	7 11	17 39	8 30	19 37	0 05	11 21	9 36	21 28	11 09	23 45
Feb. 10	7 04	18 07	7 28	18 24	8 26	19 56	23 33	10 43	9 04	20 58	10 30	23 08
20	6 56	18 14	7 40	19 08	8 21	20 13	22 07	10 13	8 30	20 28	9 53	22 33
Mar. 2	6 46	18 21	7 35	19 39	8 15	20 29	22 47	9 51	7 57	19 59	9 17	21 57
12	6 35	18 27	7 02	19 20	8 09	20 45	22 15	9 15	7 25	19 31	8 40	21 22
22	6 24	18 33	6 03	18 09	8 04	21 02	21 37	8 37	6 52	19 02	8 04	20 48
Apr. 1	6 12	18 39	5 17	17 03	8 01	21 19	20 53	7 53	6 20	18 34	7 29	20 15
11	6 01	18 44	4 55	16 37	8 02	21 37	19 33	7 37	5 47	18 05	6 53	19 41
21	5 50	18 50	4 45	16 41	8 03	21 53	19 09	6 15	5 14	17 38	5 18	19 08
May 1	5 41	18 56	4 45	17 03	8 09	22 09	18 06	5 18	4 41	17 09	5 42	18 36
11	5 33	19 02	4 53	17 41	8 17	22 21	17 03	4 17	4 09	16 39	5 07	18 01
21	5 28	19 08	5 14	18 36	8 28	22 28	16 22	3 40	3 36	16 10	4 32	17 28
31	5 24	19 14	5 51	19 43	8 39	22 31	15 38	2 56	3 04	15 40	3 56	16 54
June 10	5 23	19 18	6 36	20 34	8 48	22 26	14 59	2 15	2 30	15 10	3 20	16 20
20	5 24	19 21	7 12	21 00	8 54	22 16	14 26	1 40	1 55	14 39	2 45	15 45
30	5 26	19 23	8 29	20 57	8 53	22 01	14 00	1 06	1 21	14 07	2 08	15 00
July 10	5 31	19 22	7 37	20 49	8 47	21 37	13 36	0 36	0 46	13 34	1 32	14 34
20	5 36	19 19	6 34	19 36	8 30	21 06	12 14	0 10	0 11	13 01	0 55	13 59
30	5 41	19 13	5 26	18 34	8 00	20 24	13 04	23 50	23 34	12 26	0 18	13 22
Aug. 9	5 47	19 06	4 36	17 54	7 13	19 31	12 41	23 19	22 57	12 21	23 40	12 46
19	5 52	18 57	4 33	17 55	6 11	18 31	12 29	23 01	21 19	11 13	23 02	12 08
29	5 58	18 46	5 13	18 17	5 06	17 34	12 20	22 42	21 40	10 34	22 23	11 29
Sept. 8	6 03	18 35	6 04	18 36	4 12	16 48	12 09	22 25	21 01	9 51	21 42	10 48
18	6 08	18 23	6 48	18 46	3 35	16 17	12 01	22 11	20 20	9 10	21 04	10 08
28	6 13	18 11	7 22	18 50	3 12	15 56	11 53	21 59	19 38	8 26	20 23	9 25
Oct. 8	6 18	17 59	7 55	18 49	3 02	15 42	11 46	21 48	18 55	7 41	19 42	8 44
18	6 24	17 49	8 18	18 50	2 59	15 31	10 39	22 39	18 11	6 57	19 00	8 02
28	6 30	17 39	8 29	18 45	3 03	15 21	11 31	21 33	17 25	6 07	18 19	7 19
Nov. 7	6 37	17 32	8 05	18 19	3 08	15 14	11 22	21 28	16 41	5 21	17 33	6 33
17	6 45	17 27	6 32	17 14	3 16	15 08	11 12	21 24	15 58	4 38	16 51	5 49
27	6 53	17 24	5 28	16 24	3 27	15 03	11 00	21 22	15 17	3 53	15 09	5 07
Dec. 7	7 01	17 24	5 30	16 12	3 40	14 58	10 47	21 19	14 34	3 12	15 27	4 25
17	7 08	17 27	5 56	16 20	3 55	14 55	10 34	21 16	13 54	2 32	14 47	3 43
27	7 12	17 32	6 27	16 39	4 12	14 56	10 18	21 14	12 15	1 53	14 06	3 02
32	7 14	17 35	6 43	16 49	4 19	14 57	10 11	21 11	12 55	1 33	13 46	2 42

Visibility of Planets in Morning and Evening Twilight

(Dates are approximate)

	Morning	Evening	Heliacal Setting
Saturn	May 20 – Nov. 6	Jan. 1 – Apr. 12 Nov. 6 – Dec. 31	Apr. 13 – May 19

Vaidhriti and Vyatipata Yoga, 1999

The ancient Indian astronomers used two kinds of aspect of the Sun and the Moon *viz.*, the *Vyatipata* aspects, when the sum of the *tropical longitude* of the Sun and the Moon amounts to 180° and the *Vaidhriti* aspect when it amounts to 360°. These aspects are shown with the symbol *Capital V* and *Small v* respectively. These two items also shown under 'Aspects and Phenomena' and denoted by the symble ☽ v☉ and ☽ V☉ in the Ephemeris and treated as special *Yoga.*

Vaidhriti				Vyatipata				Vaidhriti				Vyatipata				Vaidhriti				Vyatipata			
	d	*h*	*m*		*d*	*h*	*m*		*d*	*h*	*m*		*d*	*h*	*m*		*d*	*h*	*m*		*d*	*h*	*m*
Jan.	0	21	46	Jan.	13	20	51	Jan,	26	10	17	Feb.	7	25	35	Feb.	20	20	26	Mar.	5	7	07
Mar.	18	10	23	Mar.	30	13	38	Apr.	12	26	11	Apr.	24	20	10	May	8	13	30	May	20	6	33
June	2	20	11	June	14	23	35	June	27	26	11	July	10	18	11	July	23	8	36	Aug.	5	8	47
Aug.	17	15	51	Aug.	30	20	34	Sept.	11	25	03	Sept.	25	10	09	Oct.	7	10	22	Oct.	20	23	39
Nov.	1	18	03	Nov.	15	7	40	Nov.	26	28	45	Dec.	10	10	44	Dec.	22	23	48	Jan.	4	13	01

Nirayana Longitudes of Mean Sun at 5-30 a.m. IST, 1999 and Mean Ayanamsa and True Ayanamsa, 1999

Date	Nirayana Mean Sun	Mean Ayanamsa	Nutation in Long.	True Ayanamsa	Date	Nirayana Mean Sun	Mean Ayanamsa	Nutation in Long.	True Ayanamsa
	s ° ' "	° ' "	"	° ' "		s ° ' "	° ' "	"	° ' "
Jan. 1	8 16 22 12	23 50 35	−10	23 50 25	July 10	2 23 38 08	23 51 01	−12	23 50 49
11	8 26 13 33	23 50 37	−10	23 50 27	20	3 03 29 30	23 51 03	−12	23 50 51
21	9 06 04 55	23 50 38	−9	23 50 29	30	3 13 20 52	23 51 05	−12	23 50 53
31	9 15 56 17	23 50 39	−9	23 50 30	Aug. 9	3 23 12 14	23 51 06	−12	23 50 54
Feb. 10	9 25 47 39	23 50 40	−9	23 50 31	, 19	4 03 03 36	23 51 07	−12	23 50 55
20	9 05 39 01	23 50 42	−10	23 50 32	29	4 12 54 58	23 51 08	−12	23 50 56
Mar. 2	10 15 30 23	23 50 44	−10	23 50 34	Sep. 8	.4 22 46 20	23 51 09	−12	23 50 57
12	10 25 21 45	23 50 45	−11	23 50 34	18	5 02 37 42	23 51 11	−13	23 50 58
22	11 05 13 07	23 50 46	−11	23 50 35	28	5 12 29 04	23 51 11	−13	23 50 58
Apr. 1	11 15 04 29	23 50 48	−12	23 50 36	Oct. 8	5 22 20 26	23 51 13	−13	23 51 00
11	11 24 55 51	23 50 49	−12	23 50 37	18	6 02 11 47	23 51 16	−15	23 51 01
21	0 04 47 13	23 50 51	−13	23 50 38	28	6 12 03 09	23 51 16	−15	23 51 01
May 1	0 14 38 35	23 50 52	−13	23 50 39	Nov. 7	6 21 54 31	23 51 18	−15	23 51 03
11	0 24 29 57	23 50 53	−13	23 50 40	17	7 01 45 53	23 51 19	−15	23 51 04
21	1 04 21 19	23 50 55	−13	23 50 42	27	7 11 37 15	23 51 21	−15	23 51 06
31	1 14 12 40	23 50 56	−13	23 50 43	Dec. 7	7 21 28 37	23 51 22	−15	23 51 07
June 10	1 24 04 02	23 50 57	−13	23 50 44	17	8 01 19 59	23 51 24	−15	23 51 09
20	2 03 55 24	23 50 58	−12	23 50 46	27	8 11 11 21	23 51 25	−14	23 51 11
30	2 13 46 46	23 51 00	−12	23 50 48	32	8 16 07 02	23 51 26	−14	23 51 12

Short method for finding the value of Nutation in long. according to Nirayana long. of True Rahu

Rahu	Corr.
s °	"
11 07	0
11 22	− 5
0 07	− 9
0 22	−12
1 07	−15
1 22	−16
2 07	−17
2 22	−16
3 07	−15
3 22	−12
4 07	− 9
4 22	− 5
5 07	0
5 22	+ 5
6 07	+ 9
6 22	+12
7 07	+15
7 22	+16
8 07	+17
8 22	+16
9 07	+15
9 22	+12
10 07	+ 9
10 22	+ 5
11 07	0

Daily motion of Mean Sun is 0° 59' 8.2"

N.B.— Nirayana Mean Sun also serves the purpose of the fraction of the year expressed in days, 360 of which constitute a year. This may also be utilised in determining the true age of a person in terms of the fraction of year. To obtain Sayana Mean Sun add 23°51' (mean ayanamsa) to the above, and to obtain fraction of the year from 1999.0 add 103°51'.

Mean Ayanmsa for any date in 1999 = 23°50' 35."17 + precession in longitude from 1999.0 to date.

True Ayanamsa = Mean Ayanamsa + Nutation in longitude.

Mean Ayanamsa for Jan.1, 1999 : = 23° 50' 35".17; True Ayanamsa = 23° 50' 25".39

Mean Ayanamsa for Jan.1, 2000 : = 23° 51' 25".46 ; True Ayanamsa = 23° 51' 11".54

Approximate value of *Nutation* may also be found out from the Table given above.

Tithi, Nakshatra & Yoga, 1999

The following table gives the ending moments of Tithi, Nakshatra & Yoga in I.S.T. for the year 1999. The ending moments are those as are current at 5-30 a.m. I.S.T.

January

Date		Tithi T	h	m	Nakshatra N	h	m	Yoga Y	h	m
1	S	14	11	01	5	14	35	24	9	30
2		15	8	20	6	12	39	25	6	02
"		...			...			26	26	54
3	K	1	6	03	7	11	10	27	24	13
"		2	28	20	...			...		
4		3	27	18	8	10	16	1	22	02
5		4	27	02	9	10	04	2	20	27
6		5	27	33	10	10	37	3	19	29
7		6	28	50	11	11	56	4	19	06
8		7	—	—	12	13	56	5	19	14
9		7	6	44	13	16	28	6	19	46
10		8	9	04	14	19	20	7	20	32
11		9	11	38	15	22	20	8	21	24
12		10	14	10	16	25	13	9	22	10
13		11	16	29	17	27	50	10	22	45
14		12	18	25	18	—	—	11	23	01
15		13	19	52	18	6	02	12	22	56
16		14	20	49	19	7	46	13	22	27
17	K	30	21	16	20	9	00	14	21	36
18	S	1	21	15	21	9	47	15	20	23
19		2	20	48	22	10	07	16	18	50
20		3	19	59	23	10	04	17	17	00
21		4	18	50	24	9	41	18	14	53
22		5	17	23	25	9	00	19	12	33
23		6	15	42	26	8	04	20	10	01
24		7	13	47	27	6	54	21	7	17
"		...			...			22	28	25
25		8	11	41	1	5	32	23	25	25
"		...			2	28	02	...		
26		9	9	28	3	26	27	24	22	21
27		10	7	10	4	24	50	25	19	15
"		11	28	52	...			...		
28		12	26	40	5	23	18	26	16	12
29		13	24	39	6	21	57	27	13	15
30		14	22	56	7	20	52	1	10	30
31	S	15	21	37	8	20	10	2	8	01

February

Date		Tithi T	h	m	Nakshatra N	h	m	Yoga Y	h	m
1	K	1	20	48	9	19	57	3	5	54
"		...			...			4	28	12
2		2	20	34	10	20	18	5	26	58
3		3	20	58	11	21	16	6	26	14
4		4	22	01	12	22	52	7	25	59
5		5	23	39	13	25	01	8	26	10
6		6	25	47	14	27	37	9	26	43
7		7	28	12	15	—	—	10	27	28
8		8	—	—	15	6	30	11	28	18
9		8	6	43	16	9	26	12	29	02
10		9	9	05	17	12	13	13	—	—
11		10	11	05	18	14	38	13	5	32
12		11	12	33	19	16	32	14	5	39
"		...			...			15	29	19
13		12	13	24	20	17	50	16	28	29
14	K	13	13	36	21	18	29	17	27	09

February —*contd.*

Date		Tithi T	h	m	Nakshatra N	h	m	Yoga Y	h	m
15	K	14	13	10	22	18	32	18	25	21
16	K	30	12	09	23	18	03	19	23	07
17	S	1	10	39	24	17	07	20	20	33
18		2	8	46	25	15	50	21	17	44
19		3	6	37	26	14	19	22	14	43
"		4	28	18	...			...		
20		5	25	55	27	12	40	23	11	36
21		6	23	33	1	11	00	24	8	28
"		...			...			25	29	22
22		7	21	17	2	9	23	26	26	21
23		8	19	11	3	7	54	27	23	29
24		9	17	18	4	6	36	1	20	48
25		10	15	39	5	5	31	2	18	19
"		...			6	28	43	...		
26		11	14	18	7	28	13	3	16	04
27		12	13	16	8	28	03	4	14	05
28	S	13	12	36	9	28	16	5	12	23

March

Date		Tithi T	h	m	Nakshatra N	h	m	Yoga Y	h	m
1	S	14	12	19	10	28	53	6	10	59
2	S	15	12	29	11	—	—	7	9	56
3	K	1	13	06	11	5	57	8	9	14
4		2	14	13	12	7	29	9	8	55
5		3	15	48	13	9	28	10	8	58
6		4	17	48	14	11	53	11	9	20
7		5	20	08	15	14	38	12	9	59
8		6	22	36	16	17	33	13	10	48
9		7	25	02	17	20	29	14	11	39
10		8	27	13	18	23	11	15	12	24
11		9	28	54	19	25	29	16	12	53
12		10	—	—	20	27	10	17	12	57
13		10	5	58	21	28	09	18	12	29
14		11	6	16	22	28	23	19	11	27
15		12	5	48	23	27	53	20	9	49
"		13	28	35	...			...		
16		14	26	43	24	26	44	21	7	36
"		...			...			22	28	51
17	K	30	24	18	25	25	03	23	25	42
18	S	1	21	29	26	22	58	24	22	13
19		2	18	26	27	20	40	25	18	33
20		3	15	18	1	18	17	26	14	49
21		4	12	14	2	16	00	27	11	08
22		5	9	22	3	13	57	1	7	36
"		...			...			2	28	21
23		6	6	50	4	12	13	3	25	24
"		7	28	41	...			...		
24		8	27	02	5	10	56	4	22	51
25		9	25	51	6	10	07	5	20	41
26		10	25	11	7	9	48	6	18	55
27		11	24	59	8	9	57	7	17	32
28		12	25	14	9	10	34	8	16	31
29		13	25	53	10	11	36	9	15	49
30		14	26	55	11	13	01	10	15	25
31	S	15	28	19	12	14	47	11	15	19

The numbers of *tithis* have been shown from *Sukla* 1 to *Sukla* 15 (Full-moon) and again from Krishna 1 to Krishna 14 and then K 30 (New Moon) using the symbols S for *Sukla Paksha* and K for *Krishna Paksha.*

Tithi, Nakshatra & Yoga, 1999

Date		Tithi			Nakshatra			Yoga		
April										
		T	*h*	*m*	*N*	*h*	*m*	*Y*	*h*	*m*
1	K	1	—	—	13	16	54	12	15	29
2		1	6	03	14	19	20	13	15	53
3		2	8	05	15	22	01	14	16	31
4		3	10	23	16	24	55	15	17	20
5		4	12	50	17	27	54	16	18	14
6		5	15	18	18	—	—	17	19	07
7		6	17	36	18	6	48	18	19	53
8		7	19	34	19	9	27	19	20	21
9		8	20	58	20	11	38	20	20	25
10		9	21	40	21	13	12	21	19	55
11		10	21	32	22	14	00	22	18	48
12		11	20	35	23	13	59	23	17	02
13		12	18	49	24	13	09	24	14	36
14		13	16	21	25	11	36	25	11	35
15		14	13	19	26	9	26	26	8	04
"			...			...		27	28	10
16	K	30	9	52	27	6	50	1	24	03
"			...		1	27	59		...	
17	S	1	6	12	2	25	04	2	19	52
"		2	26	29		...			...	
18		3	22	55	3	22	17	3	15	45
19		4	19	39	4	19	49	4	11	50
20		5	16	51	5	17	48	5	8	16
"			...			...		6	29	08
21		6	14	38	6	16	22	7	26	30
22		7	13	03	7	15	36	8	24	26
23		8	12	10	8	15	29	9	22	54
24		9	11	56	9	16	02	10	21	53
25		10	12	20	10	17	10	11	21	19
26		11	13	14	11	18	47	12	21	08
27		12	14	35	12	20	49	13	21	16
28		13	16	17	13	23	09	14	21	39
29		14	18	14	14	25	44	15	22	14
30	S	15	20	25	15	28	30	16	22	58
May										
1	K	1	22	44	16	—	—	17	23	49
2		2	25	09	16	7	24	18	24	44
3		3	27	34	17	10	22	19	25	39
4		4	—	—	18	13	18	20	26	31
5		4	5	53	19	16	06	21	27	12
6		5	7	58	20	18	35	22	27	36
7		6	9	37	21	20	37	23	27	34
8		7	10	42	22	22	02	24	27	02
9		8	11	04	23	22	42	25	25	52
10		9	10	37	24	22	33	26	24	03
11		10	9	21	25	21	36	27	21	35
12		11	7	17	26	19	54	1	18	30
"		12	28	32		...			...	
13		13	25	13	27	17	36	2	14	54
14		14	21	30	1	14	49	3	10	54
15	K	30	17	35	2	11	46	4	6	38
"			...			...		5	26	17
16	S	1	13	39	3	8	39	6	21	58

Date		Tithi			Nakshatra			Yoga		
May—*contd.*										
		T	*h*	*m*	*N*	*h*	*m*	*Y*	*h*	*m*
17	S	2	9	53	4	5	39	7	17	53
"			...		5	26	59		...	
18		3	6	29	6	24	49	8	14	09
"		4	27	36		...			...	
19		5	25	21	7	23	16	9	10	53
20		6	23	51	8	22	28	10	8	11
21		7	23	08	9	22	26	11	6	06
"			...			...		12	28	39
22		8	23	11	10	23	09	13	27	48
23		9	23	56	11	24	33	14	27	29
24		10	25	15	12	26	31	15	27	36
25		11	27	02	13	28	55	16	28	04
26		12	29	08	14	—	—	17	28	46
27		13	—	—	14	7	37	18	—	—
28		13	7	25	15	10	28	18	5	37
29		14	9	47	16	13	25	19	6	32
30	S	15	12	10	17	16	22	20	7	28
31	K	1	14	29	18	19	14	21	8	22
June										
1	K	2	16	40	19	21	58	22	9	11
2		3	18	38	20	24	27	23	9	50
3		4	20	16	21	26	37	24	10	17
4		5	21	28	22	28	19	25	10	26
5		6	22	07	23	29	28	26	10	11
6		7	22	06	24	—	—	27	9	27
7		8	21	23	24	5	56	1	8	11
8		9	19	55	25	5	42	2	6	19
"			...		26	28	44	3	27	53
9		10	17	46	27	27	06	4	24	53
10		11	14	59	1	24	54	5	21	24
11		12	11	43	2	22	16	6	17	33
12		13	8	07	3	19	23	7	13	27
"		14	28	20		...			...	
13	K	30	24	33	4	16	24	8	9	15
"			...			...		9	29	04
14	S	1	20	57	5	13	33	10	25	05
15		2	17	43	6	11	00	11	21	26
16		3	14	59	7	8	54	12	18	14
17		4	12	55	8	7	26	13	15	35
18		5	11	35	9	6	42	14	13	33
19		6	11	03	10	6	45	15	12	10
20		7	11	19	11	7	34	16	11	24
21		8	12	17	12	9	07	17	11	12
22		9	13	52	13	11	15	18	11	28
23		10	15	52	14	13	50	19	12	05
24		11	18	09	15	16	41	20	12	56
25		12	20	33	16	19	39	21	13	53
26		13	22	55	17	22	35	22	14	50
27		14	25	08	18	25	24	23	15	43
28	S	15	27	07	19	27	59	24	16	26
29	K	1	28	50	20	—	—	25	16	57
30	K	2	—	—	20	6	18	26	17	14

Names of Tithis :— 1 Pratipat, 2 Dvitiya, 3 Tritiya, 4 Chaturthi, 5 Panchami, 6 Sasthi, 7 Saptami, 8 Astami, 9 Navami, 10 Dasami, 11 Ekadasi, 12 Dvadasi, 13 Trayodasi, 14 Caturdasi, 15 Paurnamasi (*Full-moon*) & 30 Amavasya (*New-moon*). [Light-half (*Sukalpaksa*) from 1 to 15 and dark-half (*Krisnapaksa*) from 1 to 14 & then 30].

Tithi, Nakshatra & Yoga, 1999

Date	Tithi				Nakshatra			Yoga		
July										
		T	h	m	N	h	m	Y	h	m
1	K	2	6	12	21	8	17	27	17	13
2		3	7	11	22	9	53	1	16	54
3		4	7	43	23	11	02	2	16	12
4		5	7	45	24	11	42	3	15	06
5		6	7	15	25	11	49	4	13	33
6		7	6	11	26	11	24	5	11	33
"		8	28	34		...			...	
7		9	26	25	27	10	25	6	9	07
8		10	23	49	1	8	56	7	6	15
"			...			...		8	27	00
9		11	20	51	2	7	00	9	23	29
"			...		3	28	45		...	
10		12	17	37	4	26	17	10	19	46
11		13	14	18	5	23	47	11	15	58
12		14	11	00	6	21	23	12	12	12
13	K	30	7	54	7	19	15	13	8	36
"	S	1	29	08		...		14	29	18
14		2	26	51	8	17	33	15	26	23
15		3	25	11	9	16	23	16	23	59
16		4	24	12	10	15	54	17	22	07
17		5	23	58	11	16	08	18	20	52
18		6	24	29	12	17	06	19	20	13
19		7	25	41	13	18	46	20	20	06
20		8	27	27	14	21	01	21	20	28
21		9	—	—	15	23	42	22	21	09
22		9	5	36	16	26	36	23	22	03
23		10	7	58	17	—	—	24	23	00
24		11	10	19	17	5	33	25	23	52
25		12	12	30	18	8	21	26	24	33
26		13	14	23	19	10	53	27	24	57
27		14	15	52	20	13	03	1	25	03
28	S	15	16	55	21	14	47	2	24	47
29	K	1	17	30	22	16	04	3	24	09
30		2	17	37	23	16	54	4	23	09
31	K	3	17	17	24	17	18	5	21	48
August										
1	K	4	16	32	25	17	16	6	20	07
2		5	15	22	26	16	50	7	18	07
3		6	13	51	27	16	03	8	15	49
4		7	11	59	1	14	56	9	13	14
5		8	9	50	2	13	31	10	10	25
6		9	7	27	3	11	53	11	7	25
"		10	28	53		...		12	28	16
7		11	26	14	4	10	06	13	25	02
8		12	23	34	5	8	14	14	21	48
9		13	21	01	6	6	23	15	18	38
"			...		7	28	41		...	
10		14	18	40	8	27	14	16	15	38
11	K	30	16	39	9	26	08	17	12	53
12	S	1	15	03	10	25	31	18	10	28
13		2	14	00	11	25	28	19	8	28
14		3	13	33	12	26	04	20	6	57
15	S	4	13	47	13	27	18	21	5	58

Date	Tithi				Nakshatra			Yoga		
August —*contd.*										
		T	h	m	N	h	m	Y	h	m
16	S	5	14	40	14	29	11	22	5	30
17		6	16	10	15	—	—	23	5	31
18		7	18	10	15	7	34	24	5	58
19		8	20	27	16	10	20	25	6	43
20		9	22	50	17	13	16	26	7	38
21		10	25	06	18	16	10	27	8	32
22		11	27	01	19	18	47	1	9	17
23		12	28	28	20	21	00	2	9	44
24		13	29	21	21	22	40	3	9	47
25		14	—	—	22	23	45	4	9	23
26		14	5	37	23	24	16	5	8	31
"	S	15	29	18		...			...	
27	K	1	28	27	24	24	14	6	7	11
"			...			...		7	29	25
28		2	27	09	25	23	44	8	27	18
29		3	25	29	26	22	52	9	24	53
30		4	23	32	27	21	43	10	22	14
31	K	5	21	25	1	20	22	11	19	27
September										
1	K	6	19	11	2	18	54	12	16	33
2		7	16	55	3	17	25	13	13	38
3		8	14	40	4	15	56	14	10	43
4		9	12	30	5	14	32	15	7	50
"			...			...		16	29	03
5		10	10	26	6	13	15	17	26	23
6		11	8	32	7	12	07	18	23	52
7		12	6	50	8	11	12	19	21	33
"		13	29	23		...			...	
8		14	28	16	9	10	34	20	19	28
9	K	30	27	32	10	10	15	21	17	41
10	S	1	27	17	11	10	21	22	16	14
11		2	27	33	12	10	54	23	15	11
12		3	28	22	13	12	00	24	14	34
13		4	—	—	14	13	38	25	14	23
14		4	5	45	15	15	48	26	14	37
15		5	7	39	16	18	25	27	15	12
16		6	9	55	17	21	19	1	16	02
17		7	12	22	18	24	18	2	16	59
18		8	14	47	19	27	09	3	17	52
19		9	16	56	20	—	—	4	18	30
20		10	18	34	20	5	38	5	18	46
21		11	19	34	21	7	33	6	18	31
22		12	19	49	22	8	47	7	17	42
23		13	19	19	23	9	17	8	16	17
24		14	18	08	24	9	05	9	14	19
25	S	15	16	21	25	8	14	10	11	50
26	K	1	14	06	26	6	53	11	8	58
"			...		27	29	09		...	
27		2	11	32	1	27	12	12	5	48
"			...			...		13	26	27
28		3	8	47	2	25	11	14	23	03
29		4	5	59	3	23	13	15	19	41
"		5	27	17		...			...	
30	K	6	24	47	4	21	26	16	16	26

Names of Nakshatras :— 1 Asvini, 2 Bharani, 3 Krittika, 4 Rohini, 5 Mrgasirsa, 6 Arda, 7 Punarvasu, 8 Pusya, 9 Aslesha, 10 Magha, 11 Purvaphalguni, 12 Uttaraphalguni, 13 Hasta, 14 Chitra, 15 Svati, 16 Visakha, 17 Anuradha, 18 Jyestha, 19 Mula, 20 Purvasadha, 21 Uttarasadha, 22 Sravana, 23 Dhanistha *(Sravistha)*, 24 Satabhisaj, 25 Purvabhadrapada, 26 Uttarbhadrapada & 27 Revati.

Tithi, Nakshatra & Yoga, 1999

Date		Tithi T	h	m	Nakshatra N	h	m	Yoga Y	h	m
October										
1	K	7	22	32	5	19	54	17	13	23
2		8	20	37	6	18	41	18	10	35
3		9	19	02	7	17	48	19	8	03
4		10	17	49	8	17	15	20	5	48
"			...			...		21	27	50
5		11	16	56	9	17	04	22	26	08
6		12	16	25	10	17	13	23	24	43
7		13	16	15	11	17	43	24	23	35
8		14	16	28	12	18	35	25	22	44
9	K	30	17	04	13	19	51	26	22	13
10	S	1	18	07	14	21	32	27	22	02
11		2	19	37	15	23	38	1	22	11
12		3	21	33	16	26	10	2	22	40
13		4	23	52	17	29	01	3	23	25
14		5	26	24	18	—	—	4	24	21
15		6	29	00	18	8	04	5	25	21
16		7	—	—	19	11	08	6	26	13
17		7	7	26	20	13	58	7	26	49
18		8	9	26	21	16	20	8	26	58
19		9	10	48	22	18	04	9	26	33
20		10	11	23	23	19	00	10	25	28
21		11	11	06	24	19	05	11	23	43
22		12	9	59	25	18	22	12	21	19
23		13	8	05	26	16	56	13	18	21
24		14	5	33	27	14	55	14	14	55
"	S	15	26	32		...			...	
25	K	1	23	14	1	12	31	15	11	09
26		2	19	48	2	9	53	16	7	12
"			...			...		17	27	13
27		3	16	25	3	7	14	18	23	19
"			...		4	28	43		...	
28		4	13	16	5	26	30	19	19	38
29		5	10	27	6	24	43	20	16	15
30		6	8	06	7	23	25	21	13	16
31		7	6	16	8	22	40	22	10	43
"	K	8	29	00		...			...	
November										
1	K	9	28	17	9	22	28	23	8	37
2		10	28	05	10	22	47	24	6	56
3		11	28	21	11	23	34	25	5	40
"			...			...		26	28	46
4		12	29	03	12	24	46	27	28	10
5		13	—	—	13	26	21	1	27	53
6		13	6	08	14	28	16	2	27	52
7		14	7	35	15	—	—	3	28	07
8	K	30	9	23	15	6	32	4	28	37
9	S	1	11	30	16	9	06	5	29	19
10		2	13	54	17	11	57	6	—	—
11		3	16	31	18	14	59	6	6	13
12		4	19	13	19	18	07	7	7	12
13		5	21	49	20	21	11	8	8	11
14		6	24	08	21	23	57	9	9	02
15		7	25	55	22	26	14	10	9	34
16	S	8	26	59	23	27	50	11	9	40

Date		Tithi T	h	m	Nakshatra N	h	m	Yoga Y	h	m
November —*contd.*										
17	S	9	27	13	24	28	36	12	9	11
18		10	26	34	25	28	31	13	8	03
19		11	25	01	26	27	34	14	6	12
"			...			...		15	27	40
20		12	22	42	27	25	52	16	24	31
21		13	19	44	1	23	33	17	20	51
22		14	16	17	2	20	47	18	16	48
23	S	15	12	34	3	17	46	19	12	31
24	K	1	8	44	4	14	43	20	8	09
"		2	29	00		...		21	27	52
25		3	25	33	5	11	48	22	23	47
26		4	22	31	6	9	13	23	20	03
27		5	20	02	7	7	07	24	16	46
28		6	18	13	8	5	36	25	13	59
"			...		9	28	46		...	
29		7	17	06	10	28	38	26	11	46
30	K	8	16	42	11	29	10	27	10	06
December										
1	K	9	16	58	12	—	—	1	8	59
2		10	17	50	12	6	19	2	8	20
3		11	19	13	13	8	00	3	8	06
4		12	21	00	14	10	07	4	8	12
5		13	23	07	15	12	34	5	8	35
6		14	25	29	16	15	17	6	9	11
7	K	30	28	02	17	18	12	7	9	56
8	S	1	—	—	18	21	14	8	10	49
9		1	6	40	19	24	19	9	11	44
10		2	9	20	20	27	21	10	12	40
11		3	11	55	21	—	—	11	13	31
12		4	14	15	21	6	13	12	14	11
13		5	16	12	22	8	45	13	14	34
14		6	17	35	23	10	48	14	14	32
15		7	18	17	24	12	13	15	13	59
16		8	18	11	25	12	54	16	12	51
17		9	17	16	26	12	46	17	11	04
18		10	15	33	27	11	52	18	8	39
19		11	13	07	1	10	13	19	5	38
"			...			...		20	26	05
20		12	10	05	2	7	58	21	22	08
"			...		3	29	16		...	
21		13	6	36	4	26	16	22	17	54
"		14	26	51		...			...	
22	S	15	23	01	5	23	11	23	13	31
23	K	1	19	17	6	20	12	24	9	09
"			...			...		25	28	56
24		2	15	49	7	17	29	26	25	00
25		3	12	47	8	15	13	27	21	29
26		4	10	19	9	13	33	1	18	29
27		5	8	33	10	12	34	2	16	03
28		6	7	34	11	12	21	3	14	14
29		7	7	23	12	12	55	4	13	02
30		8	7	57	13	14	12	5	12	25
31		9	9	14	14	16	08	6	12	19
32	K	10	11	04	15	18	33	7	12	37

Names of Yogas :— 1 Viskumbha, 2 Priti, 3 Ayusman, 4 Saubhagya, 5 Sobhana, 6 Atiganda, 7 Sukarma, 8 Dhriti, 9 Sula, 10 Ganda, 11 Vriddhi, 12 Dhruva, 13 Vyaghata, 14 Harsana, 15 Vajra, 16 Siddhi (Asrik), 17 Vyatipata, 18 Variyan, 19 Parigha, 20 Siva, 21 Siddha, 22 Sadhya, 23 Shubha, 24 Sukla (Sukra), 25 Brahma, 26 Indra & Vaidhriti.

KARANA–1999

In each *Tithi* there are two *Karanas* covering the two halves of the *tithimana*, the first *Karana* ends at the middle time of the *tithi* and the second *Karana* ends with the ending of that *tithi*. A *Karana* is completed when the nirayana longitude of the Moon gains every 6° degrees on that of the Sun. The ending times of each *Karana* are given below in I.S.T. in *hours* and *minutes*.

Date	Ending time of Karanas
Jan. 1	Vanija upto *h* 11-01 then Vishti upto *h* 21-41
2	Bava 8-20 then Balava 19-11
3	Kaulava 6-03 then Taitila 17-11 then Gara 28-20
4	Vanija 15-49 then Vishti upto 27-18
5	Bava 15-10 then Balava 27-02
6	Kaulava 15-18 then Taitila 27-33
7	Gara 16-12 then Vanija 28-50 then Vishti to next day
8	Vishti upto 17-47
9	Bava 6-44 then Balava 19-54
10	Kaulava 9-04 then Taitila 22-21
11	Gara 11-38 then Vanija 24-54 then Vishti to next day
12	Vishti upto 14-10 then Bava 27-19
13	Balava 16-29 then Kaulava 29-27
14	Taitila 18-25
15	Gara 7-08 then Vanija 19-52 then Vishti to next day
16	Vishti upto 8-21 then Sakuni 20-49
17	Chatuspada 9-03 then Naga 21-16
18	Kintughna 9-15 then Bava 21-15
19	Balava 9-01 then Kaulava 20-48
20	Taitila 8-23 then Gara 19-59 then Vanija to next day
21	Vanija 7-24 then Vishti upto 18-50
22	Bava 6-06 then Balava 17-23 then Kaulava 28-32
23	Taitila 15-42 then Gara 26-44 then Vanija to next day
24	Vanija 13-47 then Vishti upto 24-44
25	Bava 11-41 then Balava 22-35
26	Kaulava 9-28 then Taitila 20-19
27	Gara 7-10 then Vanija 18-01 then Vishti upto 28-52
28	Bava 3-46 then Balava 26-40
29	Kaulava 13-40 then Taitila 24-39
30	Gara 11-47 then Vanija 22-56 then Vishti to next day
31	Vishti upto 10-16 then Bava 21-37
Feb. 1	Balava 9-12 then Kaulava 20-48
2	Taitila 8-41 then Gara 20-34
3	Vanija 8-46 then Vishti upto 20-58
4	Bava 9-29 then Balava 22-01
5	Kaulava 10-50 then Taitila 23-39
6	Gara 12-43 then Vanija 25-47 then Vishti
7	Vishti upto 15-0 then Bava 28-12
8	Balava 17-28 then Kaulava to next day
9	Kaulava 6-43 then Taitila 19-54
10	Gara 9-05 then Vanija 22-05 then Vishti to next day
11	Vishti 11-05 then Bava 23-49
12	Balava 12-33 then Kaulava 24-59
13	Taitila 13-24 then Gara 25-30
14	Vanija 13-36 then Vishti upto 25-23
Feb. 15	Sakuni 13-10 then Chatuspada 24-40
16	Naga 12-09 then Kintughna 23-24
17	Bava 10-39 then Balava 21-42
18	Kaulava 8-46 then Taitila 19-41
19	Gara 6-37 then Vanija 17-27 then Vishti upto 28-18
20	Bava 15-06 then Balava 25-55
21	Kaulava 12-44 then Taitila 23-33
22	Gara 10-25 then Vanija 21-17 then Vishti to next day
23	Vishti upto 8-14 then Bava 19-11
24	Balava 6-15 then Kaulava 17-58 then Taitila 28-29
25	Gara 15-39 then Vanija 26-59
26	Vishti upto 14-18 then Bava 25-47
27	Balava 13-16 then Kaulava 24-54
28	Taitlia 12-36 then Gara 24-27
Mar. 1	Vanija 12-19 then Vishti upto 24-24
2	Bava 12-29 then Balava 24-47
3	Kaulava 13-06 then Taitila 25-29
4	Gara 14-13 then Vanija 27-0 then Vishti to next day
5	Vishti upto 15-48 then Bava 28-48
6	Balava 17-48
7	Kaulava 6-58 then Taitila 20-08
8	Gara 9-22 then Vanija 22-36 then Vishti to next day
9	Vishti upto 11-49 then Bava 25-02
10	Balava 14-07 then Kaulava 27-13
11	Taitila 16-03 then Gara 28-54
12	Vanija 17-26 then Vishti to next day
13	Vishti upto 5-58 then Bava 18-07
14	Balava 6-16 then Kaulava 18-02 then Taitila 29-48
15	Gara 17-12 then Vanija 28-35 then Vishti to next day
16	Vishti upto 15-39 then Sakuni 26-43
17	Chatuspada 13-30 then Naga 24-18
18	Kintughna 10-54 then Bava 21-29
19	Balava 7-58 then Kaulava 18-26 then Taitila 28-52
20	Gara 15-18 then Vanija 25-46 then Vishti to next day
21	Vishti upto 12-14 then Bava 22-48
22	Balava 9-22 then Kaulava 20-06
23	Taitila 6-50 then Gara 17-46 then Vanija 28-42 then Vishiti to nextday
24	Vishti upto 15-52 then Bava 27-02
25	Balava 14-27 then Kaulava 25-52
26	Taitila 13-31 then Gara 25-11
27	Vanija 13-05 then Vishti upto 24-59
28	Bava 13-07 then Balava 25-14
29	Kaulava 13-34 then Taitila 25-53
30	Gara 14-24 then Vanija 26-55 then Vishti to next day
31	Vishti upto 15-37 then Bava 28-19

Date	Ending moments of Karanas	Date	Ending moments of Karanas
Apr. 1	Balava 17 - 11	May 16	Bava 13-39 then Balava 23-46
2	Kaulava 6-03 thenTaitila 19-04	17	Kaulava 9-53 then Taitila 20-11
3	Gara 8-05 then Vanija 21-14 then Vishti to next day	18	Gara 6-29 then Vanija 17-02 then Vishti upto 27-36
4	Vishti upto10-23 then Bava 23-46	19	Bava 14-29 then Balava 25-21
5	Balava 12-50 then Kaulava 26-04	20	Kaulava 12-36 then Taitila 23-51
6	Taitila 15-18 then Gara 28-27	21	Gara 11-30 then Vanija 23-08 then Vishti to next day
7	Vanija 17-36 then Vishti to next day	22	Vishti upto 11-10 then Bava 23-11
8	Vishti upto 6-35 then Bava 19-34	23	Balava 11-33 then Kaulava 23-56
9	Balava 8-16 then Kaulava 20-58	24	Taitila 12-35 then Gara 25-15 then Vanija to next day
10	Taitila 9-19 then Gara 21-40	25	Vanija 14-09 then Vishti upto 27-02
11	Vanija 9-36 then Vishti upto 21-32	26	Bava 16-05 then Balava 29-08
12	Bava 9-04 then Balava 20-35	27	Kaulava 18-16
13	Kaulava 7-42 then Taitila 18-49 then Gara to next day	28	Taitila 7-25 then Gara 20-36 then Vanija to next day
14	Gara 5-35 then Vanija 16-21thenVishti upto 26-50	29	Vanija 9-47 then Vishti upto 22-58
15	Sakuni 13-19 then Chatuspada 23-35	30	Bava 12-10 then Balava 25-20
16	Naga 9-52 then Kintughna 20-02	31	Kaulava 14-29 then Taitila 27-35
17	Bava 6-12 then Balava 16-20 then Kaulava 26-29	June 1	Gara 16-40 then Vanija to next day
18	Taitila 12-42 then Gara 22-55 then Vanija to next day	2	Vanija upto 5-39 then Vishti upto 18-38
19	Vanija 9-19 then Vishti upto 19-39	3	Bava 7-27 then Balava 20-16
20	Bava 6-15 then Balava 16-51 then Kaulava 27-45	4	Kaulava 8-52 then Taitila 21-28
21	Taitila 14-38 then Gara 25-51 then Vanija to next day	5	Gara 9-47 then Vanija 22-07 then Vishti to next day
22	Vanija upto 13-03 then Vishti 24-37	6	Vishti upto 10-06 then Bava 22-06
23	Bava 12-10 then Balava 24-03	7	Balava 9-44 then Kaulava 21-23
24	Kaulava 11-56 then Taitila 24-08	8	Taitila 8-39 then Gara 19-55 then Vanija to next day
25	Gara 12-20 then Vanija 24-47 then Vishti to next day	9	Vanija 6-50 then Vishti upto 17-46 then Bava 28-22
26	Vishti upto 13-14 then Bava 25-55	10	Balava 14-59 then Kaulava 25-21
27	Balava 14-35 then Kaulava 27-26	11	Taitila 11-43 then Gara 21-55 then Vanija to next day
28	Taitila 16-17 then Gara to next day	12	Vanija 8-07 then Vishti upto 18-13 then Sakuni 28-20
29	Gara 5-16 then Vanija 18-14 then Vishti to next day	13	Chatuspada 14-26 then Naga 24-33
30	Vishti upto 7-20 then Bava 20-25	14	Kintughna 10-45 then Bava 20-57
May 1	Balava 9-34 then Kaulava 22-44	15	Balava 7-20 then Kaulava 17-43 then Taitila 28-21
2	Taitila 11-56 then Gara 25-09 thenVanija to next day	16	Gara 14-59 then Vanija 25-57 then Vishti to next day
3	Vanija 14-22 then Vishti 27-34	17	Vishti upto 12-55 then Bava 24-15
4	Bava 16-44 then Balava to next day	18	Balava 11-35 then Kaulava 23-19
5	Balava 5-53 then Kaulava 18-55	19	Taitila 11-03 then Gara 23-11 then Vanija to next day
6	Taitila 7-58 then Gara 20-46 then Vanija to next day	20	Vanija 11-19 then Vishti upto 23-48
7	Vanija 9-37 then Vishti upto 22-09	21	Bava 12-17 then Balava 25-04
8	Bava 10-42 then Balava 22-53	22	Kaulava 13-52 then Taitila 26-52
9	Kaulava 11-04 then Taitila 22-50	23	Gara 15-52 then Vanija 29-01 then Vishti to next day
10	Gara 10-37 then Vanija 21-59 then Vishti to next day	24	Vishti upto 18-09
11	Vishti upto 9-21 then Bava 20-19	25	Bava 7-21 then Balava 20-33
12	Balava 7-17 then Kaulava 17-54 then Taitila 28-32	26	Kaulava 9-44 then Taitila 22-55
13	Gara 14-52 then Vanija 25-13 then Vishti to next day	27	Gara 12-01 then Vanija 25-08 then Vishti to next day
14	Vishti upto 11-21 then Sakuni 21-30	28	Vishti upto 14-08 then Bava 27-07
15	Chatuspada 7-33 then Naga 17-35 then Kintughna 27-37	29	Balava 15-59 then Kaulava 28-50
		30	Taitila 17-31 then Gara to next day

Names of ***Karanas*** *:* 1 Bava, 2 Balava, 3 Kaulava, 4 Taitila, 5 Gara, 6 Vanija and 7 Vishti. Then Sakuni, Chatuspada, Naga and Kintughna.

Date	Ending moments of Karanas	Date	Ending moments of Karanas
July 1	Gara 6-12 then Vanija 18-42 then Vishti to next day	Aug.15	Vishti upto 13-47 then Bava 26-14
2	Vishti upto 7-11 then Bava 19-27	16	Balava 14-41 then Kaulava 27-25
3	Balava 7-43 then Kaulava 19-44	17	Taitila 16-10 then Gara 29-10 then Vanija to next day
4	Taitila 7-45 then Gara 19-30 then Vanija to next day	18	Vanija 18-10 then Vishti to next day
5	Vanija 7-15 then Vishti up to 18-43	19	Vishti upto 7-18 then Bava 20-17
6	Bava 6-11 then Balava 17-23 then Kaulava 28-34	20	Balava 9-39 then Kaulava 22-50
7	Taitila 15-30 then Gara 26-25 then Vanija to next day	21	Taitila 11-58 then Gara 25-06 then Vanija
8	Vanija 13-07 then Vishti upto 23-49	22	Vanija 14-3 then Vishti upto 27-01
9	Bava 10-18 then Balava 20-51	23	Bava 15-45 then Balava 28-28
10	Kaulava 7-14 then Taitila 17-37 then Gara 27-58 then Vanija to next day	24	Kaulava 16-54 then Taitila 29-21
11	Vanija 14-18 then Vishti upto 24-39	25	Gara 17-29 then Vanija to next day
12	Sakuni 11-0 then Chatuspada 21-27	26	Vanija 5-37 then Vishti upto 17-27 then Bava 29-18
13	Naga 7-54 then Kintughna 18-31	27	Balava 16-52 then Kaulava 28-27
14	Bava 5-58 then Balava 16-0 then Kaulava 26-51	28	Taitila 15-48 then Gara 27-09 then Vanija to next day
15	Taitila 14-01 then Gara 25-11 then Vanija to next day	29	Vanija 14-19 then Vishti upto 25-29
16	Vanija 12-41 then Vishti up to 24-12	30	Bava 12-30 then Balava 23-32
17	Bava 12-05 then Balava 23-58	31	Kaulava 10-29 then Taitila 21-25
18	Kaulava 12-13 then Taitila 24-29	Sept. 1	Gara 8-18 then Vanija 19-11 then Vishti to next day
19	Gara 13-05 then Vanija 25-41 then Vishti to next day	2	Vishti upto 6-03 then Bava 16-55 then Balava 27-48
20	Vishti upto 14-34 then Bava 27-27	3	Kaulava 14-40 then Taitila 25-35
21	Balava 16-32 then Kaulava to next day	4	Gara 12-30 then Vanija 23-28 then Vishti to next day
22	Kaulava 5-36 then Taitila 18-47	5	Vishti upto 10-26 then Bava 21-29
23	Gara 7-58 then Vanija 21-08 then Vishti to next day	6	Balava 8-32 then Kaulava 19-41
24	Vishti upto 10-19 then Bava 23-24	7	Taitila 6-50 then Gara 18-06 then Vanija 29-23 then Vishti to next day
25	Balava 12-30 then Kaulava 25-26	8	Vishti upto 16-49 then Sakuni 28-16
26	Taitila 14-23 then Gara 27-07 then Vanija to next day	9	Catuspada 15-54 then Naga 27-32
27	Vanija 15-52 then Vishti upto 28-23	10	Kintughna 15-24 then Bava 27-17
28	Bava 16-54 then Balava 29-24	11	Balava 15-24 then Kaulava 27-33
29	Kaulava 17-30	12	Taitila 15-57 then Gara 28-22 then Vanija to next day
30	Taitila 5-33 then Gara 17-36 then Vanija 29-27 then Vishti to next day	13	Vanija 17-04 then Vishti to next day
31	Vishti upto 17-17	14	Vishti upto 5-45 then Bava 18-42
Aug. 1	Balava 16-32 then Kaulava 27-57	15	Balava 7-39 then Kaulava 20-47
2	Taitila 15-22 then Gara 26-37 then Vanija to next day	16	Taitila 9-55 then Gara 22-08 then Vanija to next day
3	Vanija 13-51 then Vishti upto 24-55	17	Vanija 12-22 then Vishti upto 25-35
4	Bava 11-59 then Balava 22-55	18	Bava 14-47 then Balava 27-51
5	Kaulava 9-50 then Taitila 20-38	19	Kaulava 16-56 then Taitila to next day
6	Gara 7-27 then Vanija 18-10 then Vishti upto 28-53	20	Taitila 5-45 then Gara 18-34 then Vanija to next day
7	Bava 15-33 then Balava 26-14	21	Vanija 7-04 then Vishiti upto 19-34
8	Kaulava 12-54 then Taitila 23-34	22	Bava 7-41 then Balava 19-49
9	Gara 10-18 then Vanija 21-01 then Vishti to next day	23	Kaulava 7-34 then Taitila 19-19
10	Vishti upto 7-51 then Sakuni 18-40	24	Gara 6-44 then Vanija 18-08 then Vishti up to 29-15
11	Chatuspada 5-39 then Naga 16-39 then Kintughna 27-51	25	Bava 16-21 then Balava 27-14
12	Bava 15-03 then Balava 26-31	26	Kaulava 14-06 then Taitila 24-49
13	Kaulava 14-0 then Taitila 25-46	27	Gara 11-32 then Vanija 22-09 then Vishti to next day
14	Gara 13-33 then Vanija 25-40 then Vishti to next day	28	Vishti upto 8-47 then Bava 19-23
		29	Balava 5-59 then Kaulava 16-38 then Taitila 27-17
		30	Gara 14-02 then Vanija 24-47 then Vishti to next day

Names of ***Karanas :*** 1 Bava, 2 Balava, 3 Kaulava, 4 Taitila, 5 Gara, 6 Vanija and 7 Vishti. Then Sakuni, Chatuspada, Naga and Kintughna.

K A R A N A – *contd.*

Date	Ending time of Karanas
Oct. 1	Vishti upto 11-39 then Bava 22-32
2	Balava 9-35 then Kaulava 20-37
3	Taitila 7-49 then Gara 19-02 then Vanija to next day
4	Vanija 6-25 then Vishti upto 17-49 then Bava 29-22
5	Balava 16-56 then Kaulava 28-40
6	Taitila 16-25 then Gara 28-20 then Vanija to next day
7	Vanija 16-15 then Vishti upto 28-21
8	Sakuni 16-28 then Chatuspada 28-46
9	Naga 17-04 then Kintughana 29-36
10	Bava 18-07
11	Balava 6-52 then Kaulava 19-37
12	Taitila 8-35 then Gara 21-33 thanVanija to next day
13	Vanija 10-42 thenVishti upto 23-52
14	Bava 13-08 then Balava 26-24
15	Kaulava 15-42 then Taitila 29-0
16	Gara 18-13 then Vanija to next day
17	Vanija 7-26 then Vishti upto 20-26
18	Bava 9-26 then Balava 22-07
19	Kaulava 10-47 then Taitila 23-05
20	Gara 11-23 then Vanija 23-14 then Vishti to next day
21	Vishti upto 11-06 then Bava 22-32
22	Balava 9-59 then Kaulava 21-02
23	Taitila 8-05 then Gara 18-49 then Vanija to next day
24	Vanija 5-38 then Vishti upto 16-03 then Bava 26-32
25	Balava 12-53 then Kaulava 23-14
26	Taitila 9-31 then Gara 19-48 then Vanija to next day
27	Vanija 6-07 then Vishti up to 16-25 then Bava 26-51
28	Balava 13-16 then Kaulava 23-51
29	Taitila 10-27 then Gara 21-16 then Vanija to next day
30	Vanija 8-06 then Vishti up to 19-11
31	Bava 6-16 then Balava 17-38 then Kaulava 29-00
Nov. 1	Taitila 16-38 then Gara 28-17 then Vanija to next day
2	Vanija 16-11 then Vishti upto 28-05
3	Bava 16-13 then Balava 28-21
4	Kaulava 16-42 then Taitila 29-03
5	Gara 17-36 then Vanija to next day
6	Vanija 6-08 then Vishti up to 18-52
7	Sakuni 7-35 then Chatuspada 20-29
8	Naga 9-23 then Kintughna 10-27
9	Bava 11-30 then Balava 24-42
10	Kaulava 13-54 then Taitila 27-13
11	Gara 16-31 then Vanija to next day
12	Vanija 5-52 then Vishti upto 19-13
13	Bava 8-31 then Balava 21-49
14	Kaulava 10-59 then Taitila 24-08
15	Gara 13-01 then Vanija 25-55 then Vishti to next day
16.	Vishti upto14-27 then Bava 26-59
17.	Balava 15-06 then Kaulava 27-13
Nov. 18	Taitila 14-53 then Gara 26-34 then Vanija to next day
19	Vanija 13-47 then Vishti upto 25-01
20	Bava 11-52 then Balava 22-42
21	Kaulava 9-13 then Taitila 19-44
22	Gara 6-01 then Vanija 16-17 then Vishti up to 26-26
23	Bava 12-34 then Balava 22-39
24	Kaulava 8-44 then Taitila 18-52 then Gara 29-00 then Vanija to next day.
25	Vanija 15-16 then Vishti upto 25-30
26	Bava 12-02 then Balava 22-31
27	Kaulava 9-16 then Taitila 20-02
28	Gara 7-08 then Vanija 18-13 then Vishti upto 29-39
29	Bava 17-06 then Balava 28-54
30	Kaulava 16-41 then Taitila 28-50
Dec. 1	Gara 16-58 then Vanija 29-24 then Vishti to next day
2	Vishti upto 17-50
3	Bava 6-31 then Balava 19-13
4	Kaulava 8-06 then Taitila 21-00
5	Gara 10-04 then Vanija 23-07 then Vishti to next day
6	Vishti upto 12-18 then Sakuni 25-29
7	Chatuspada 14-45 then Naga 28-02
8	Kintughna 17-21
9	Bava 6-40 then Balava 20-0
10	Kaulava 9-20 then Taitila 22-37
11	Gara 11-55 then Vanija 25-05 then Vishti to next day
12	Vishti upto 14-15 then Bava 27-13
13	Balava 16-12 then Kaulava 28-53
14	Taitila 17-35 then Gara 29-56 then Vanija to next day
15	Vanija 18-17 then Vishti to next day
16	Vishti up to 6-14 then Bava 18-11 then Balava 29-44
17	Kaulava 17-16 then Taitila 28-25
18	Gara 15-33 then Vanija 26-20 then Vishti to next day
19	Vishti upto 13-07 then Bava 23-36
20	Balava 10-05 then Kaulava 20-21
21	Taitila 6-36 then Gara 16-44 then Vanija 26-51 then Vishti to next day
22	Vishti up to 12-56 then Bava 23-01
23	Balava 9-09 then Kaulava 19-16 then Taitila 29-30
24	Gara 15-49 then Vanija 26-18 then Vishti to next day
25	Vishti upto 12-47 then Bava 23-33
26	Balava 10-19 then Kaulava 21-26
27	Taitila 8-33 then Gara 20-04 then Vanija to next day
28	Vanija 7-34 then Vishti upto 19-28
29	Bava 7-23 then Balava 19-40
30	Kaulava 7-57 then Taitila 20-35
31	Gara 9-14 then Vanija 23-09 then Vishti to next day
Jan. 1	Vishti Karan upto 11-4

Names of ***Karanas*** : 1 Bava, 2 Balava, 3 Kaulava, 4 Taitila, 5 Gara, 6 Vanija 7 Vishti. Then Sakuni, Chatuspada, Naga and Kintughna.

Heliocentric Longitudes (*Nirayana*) of Planets, 1999

(At interval of 8 days)

Date	Saturn ♄	Jupiter ♃	Mars ♂	Earth ⊕	Venus ♀	Venus ♀ 4 day later	Mercury ☿	Mercury ☿ 4 day later
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
Jan. 1	0 8 47	11 8 59	4 18 46	2 16 16	9 22 27	9 28 46	6 10 45	6 22 52
9	0 9 04	11 9 42	4 22 16	2 24 25	10 5 06	10 11 26	7 4 21	7 15 29
17	0 9 21	11 10 26	4 25 46	3 2 34	10 17 47	10 24 08	7 26 28	8 7 32
25	0 9 38	11 11 10	4 29 18	3 10 43	11 0 30	11 6 50	8 18 55	9 0 51
Feb. 2	0 9 54	11 11 53	5 2 48	3 18 50	11 13 11	11 19 34	9 13 35	9 27 26
10	0 10 11	11 12 37	5 6 21	3 26 57	11 25 57	0 2 20	10 12 48	11 0 02
18	0 10 28	11 13 21	5 9 55	4 5 02	0 8 43	0 15 07	11 19 30	0 11 22
26	0 10 45	11 14 05	5 13 31	4 13 05	0 21 32	0 27 56	1 05 21	2 0 30
Mar. 6	0 11 02	11 14 49	5 17 07	4 21 07	1 4 21	1 10 47	2 25 21	3 18 30
14	0 11 19	11 15 33	5 20 45	4 29 07	1 17 14	1 23 41	4 9 53	4 27 26
22	0 11 37	11 16 17	5 24 25	5 7 05	2 0 08	2 6 35	5 13 29	5 27 49
30	0 11 54	11 17 01	5 28 07	5 15 00	2 13 03	2 19 32	6 10 51	6 22 57
Apr. 7	0 12 11	11 17 45	6 01 51	5 22 53	2 26 01	3 2 31	7 4 26	7 15 33
15	0 12 28	11 18 29	6 5 37	6 0 45	3 8 59	3 15 29	7 26 32	8 7 36
23	0 12 45	11 19 13	6 9 25	6 8 34	3 21 59	3 28 29	8 19 00	9 0 56
May 1	0 13 03	11 19 57	6 13 15	6 16 21	4 5 00	4 11 31	9 13 41	9 27 33
9	0 13 19	11 20 41	6 17 09	6 24 06	4 17 59	4 24 29	10 12 56	11 0 10
17	0 13 37	11 21 25	6 21 06	7 1 50	5 0 59	5 7 27	11 19 40	0 11 33
25	0 13 54	11 22 09	6 25 06	7 9 32	5 13 56	5 20 23	1 5 33	2 0 42
June 2	0 14 11	11 22 54	6 29 08	7 17 12	5 26 51	6 3 15	2 25 32	3 18 40
10	0 14 28	11 23 38	7 3 14	7 24 51	6 9 42	6 16 07	4 9 22	4 27 34
18	0 14 45	11 24 22	7 7 23	8 7 30	6 22 32	6 28 54	5 13 36	5 27 55
26	0 15 03	11 25 06	7 11 36	8 10 08	7 5 18	7 11 40	6 10 57	6 23 03
July 4	0 15 20	11 25 50	7 15 52	8 17 46	7 18 01	7 24 22	7 4 31	7 15 38
12	0 15 37	11 26 34	7 20 11	8 25 23	8 0 43	8 7 03	7 26 37	8 7 42
20	0 15 54	11 27 18	7 24 35	9 3 01	8 13 23	8 19 42	8 19 05	9 1 01
28	0 16 12	11 28 02	7 29 02	9 10 40	8 26 02	9 2 21	9 13 47	9 27 40
Aug. 5	0 16 29	11 28 40	8 3 32	9 18 18	9 8 41	9 15 00	10 13 03	11 0 19
13	0 16 46	11 29 30	8 8 06	9 25 59	9 21 20	9 27 39	11 19 49	0 11 43
21	0 17 04	0 0 14	8 12 44	10 3 40	10 3 59	10 10 20	1 5 44	2 0 47
29	0 17 21	0 0 58	8 17 26	10 11 23	10 16 40	10 23 01	2 25 43	3 18 50
Sept. 6	0 17 38	0 1 42	8 22 11	10 19 07	10 29 22	11 5 43	4 9 31	4 27 42
14	0 17 57	0 2 26	8 26 59	10 26 54	11 12 05	11 18 27	5 13 43	5 28 02
22	0 18 12	0 3 10	9 02 00	11 4 42	11 24 50	0 1 13	6 11 03	6 23 08
30	0 18 30	0 3 54	9 06 43	11 12 32	0 7 37	0 14 01	7 4 37	7 15 43
Oct. 8	0 18 47	0 4 37	9 11 40	11 20 25	0 20 25	0 26 49	7 26 43	8 7 47
16	0 19 04	0 5 21	9 16 48	11 28 20	1 3 14	1 9 40	8 19 11	9 1 07
24	0 19 22	0 6 05	9 21 40	0 6 17	1 16 06	1 22 33	9 13 53	9 27 47
Nov. 1	0 19 39	0 6 49	9 26 41	0 14 16	1 29 00	2 5 28	10 13 11	11 0 28
9	0 19 56	0 7 33	10 1 45	0 22 17	2 11 56	2 18 25	11 19 59	0 11 54
17	0 20 13	0 8 17	10 6 49	1 0 20	2 24 53	3 1 22	1 5 56	2 1 05
25	0 20 31	0 9 01	10 11 54	1 8 24	3 7 51	3 14 21	2 25 55	3 19 01
Dec. 3	0 20 48	0 9 45	10 16 59	1 16 30	3 20 51	3 27 21	4 9 40	4 27 50
11	0 21 06	0 10 29	10 22 03	1 24 38	4 3 51	4 10 21	5 13 51	5 28 08
19	0 21 23	0 11 12	10 27 07	2 2 46	4 16 51	4 23 21	6 11 09	6 23 14
27	0 21 40	0 11 56	11 2 09	2 10 55	4 29 50	5 6 10	7 4 42	7 15 49
32	0 21 51	0 12 24	11 5 17	2 16 00	5 7 57	—	7 18 34	—

	Jan. 1	Feb. 26	April 23	June 18	Aug. 13	Oct. 8	Dec. 3	Dec. 32
	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
URANUS	9 18 35	9 19 11	9 19 47	9 20 24	9 21 01	9 21 38	9 22 14	9 22 34
NEPTUNE	9 7 54	9 8 14	9 8 34	9 8 54	9 9 14	9 9 34	9 9 54	9 10 05
PLUTO	7 14 18	7 14 40	7 15 02	7 15 24	7 15 46	7 16 08	7 16 30	7 16 42

Right Ascension of Planets, 1999

(At interval of 8 days)

Date	Saturn ♄	Jupitar ♃	Mars ♂	Earth ⊕	Venus ♀	Venus ♀ 4 day later	Mercury ☿	Mercury ☿ 4 day later
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
Jan. 1	1 43 04	23 32 21	13 10 44	18 43 58	19 50 25	20 11 39	17 22 10	17 46 45
9	1 43 22	23 36 53	13 25 15	19 19 06	20 32 35	20 53 11	18 12 22	18 38 44
17	1 44 07	23 41 55	13 39 08	19 53 42	21 13 26	21 33 21	19 05 42	19 33 04
25	1 45 17	23 47 23	13 52 13	20 27 33	21 52 54	22 12 08	20 00 44	20 28 36
Feb. 2	1 46 52	23 53 13	14 04 21	21 00 34	22 31 03	22 40 41	20 56 35	21 24 35
10	1 48 50	23 59 22	14 15 20	21 32 43	23 08 05	23 26 17	21 52 29	22 20 07
18	1 51 10	0 05 48	14 24 51	22 04 03	23 44 20	0 02 15	22 47 04	23 12 39
26	1 53 49	0 12 27	14 32 35	22 34 38	0 20 06	0 37 55	23 35 34	23 54 02
Mar. 6	1 56 45	0 19 16	14 38 12	23 04 36	0 55 44	1 13 36	0 06 01	0 09 59
14	1 59 56	0 26 14	14 41 17	23 34 08	1 31 34	1 49 41	0 05 51	23 55 37
22	2 03 21	0 33 18	14 41 26	0 03 23	2 07 57	2 26 24	23 43 08	23 32 34
30	2 06 56	0 40 25	14 38 23	0 32 30	2 45 04	3 03 57	23 26 40	23 26 19
Apr. 7	2 10 40	0 47 33	14 32 09	1 01 41	3 23 04	3 42 25	23 31 08	23 40 16
15	2 14 30	0 54 41	14 23 00	1 31 06	4 01 59	4 21 44	23 52 50	0 08 10
23	2 18 24	1 01 45	14 11 49	2 00 52	4 41 38	5 01 37	0 25 46	0 45 21
May 1	2 22 21	1 08 44	13 59 55	2 31 07	5 21 39	5 41 39	1 06 47	1 30 06
9	2 26 17	1 15 37	13 48 44	3 01 55	6 01 33	6 21 16	1 55 26	2 23 02
17	2 30 12	1 22 19	13 39 34	3 33 21	6 40 44	6 50 51	2 53 09	3 25 56
25	2 34 02	1 28 49	13 33 18	4 05 22	7 18 34	7 36 47	4 01 08	4 38 00
June 2	2 37 45	1 35 05	13 30 18	4 37 54	7 54 25	8 11 27	5 15 11	5 51 12
10	2 41 20	1 41 03	13 30 35	5 10 51	8 27 47	8 43 24	6 24 55	6 55 35
18	2 44 45	1 46 41	13 33 55	5 44 05	8 58 13	9 12 10	7 22 51	7 46 31
26	2 47 56	1 51 54	13 40 01	6 17 21	9 25 11	9 37 10	8 06 29	8 22 33
July 4	2 50 53	1 56 40	13 48 32	6 50 28	9 48 03	9 57 42	8 34 28	8 41 56
12	2 53 32	2 00 57	13 59 10	7 23 17	10 05 59	10 12 46	8 44 36	8 42 17
20	2 55 52	2 04 39	14 11 44	7 55 38	10 17 51	10 21 00	8 35 19	8 24 58
28	2 57 51	2 07 44	14 25 59	8 27 22	10 22 02	10 20 47	8 13 37	8 04 19
Aug. 5	2 59 28	2 10 07	14 41 45	8 58 28	10 17 12	10 11 21	7 59 57	8 02 22
13	3 00 39	2 11 46	14 58 56	9 28 57	10 03 35	9 54 25	8 12 19	8 29 32
21	3 01 25	2 12 38	15 17 27	9 58 50	9 44 40	9 35 17	8 52 56	9 20 43
29	3 01 44	2 12 41	15 37 12	10 28 13	9 27 10	9 21 01	9 50 45	10 21 08
Sept. 6	3 01 39	2 11 55	15 58 06	10 57 13	9 17 18	9 16 08	10 50 39	11 18 47
14	3 01 02	2 10 20	16 20 04	11 26 00	9 17 28	9 21 07	11 45 29	12 10 52
22	3 00 01	2 08 00	16 43 02	11 54 41	9 26 51	9 34 24	12 35 10	12 58 35
30	2 58 36	2 05 01	17 06 51	12 23 28	9 43 32	9 54 00	13 21 19	13 43 28
Oct. 8	2 56 50	2 01 29	17 31 25	12 52 32	10 05 35	10 18 05	14 05 09	14 26 19
16	2 54 45	1 57 33	17 56 36	13 22 02	10 31 21	10 45 15	14 46 50	15 06 24
24	2 52 26	1 53 27	18 22 14	13 52 08	10 59 41	11 14 33	15 24 25	15 39 56
Nov. 1	2 49 58	1 49 21	18 48 08	14 22 58	11 29 49	11 45 25	15 51 18	15 58 13
9	2 47 25	1 45 28	19 14 09	14 54 39	12 01 18	12 17 27	15 52 00	15 37 39
17	2 44 54	1 41 59	19 40 08	15 27 14	12 33 50	12 50 28	15 17 37	15 01 19
25	2 42 31	1 39 03	20 05 56	16 00 42	13 07 20	13 24 29	14 55 30	15 00 29
Dec 3	2 40 19	1 36 48	20 31 27	16 34 58	13 41 53	13 59 34	15 13 18	15 31 10
11	2 38 23	1 35 20	20 56 36	17 09 54	14 17 32	14 35 48	15 52 09	16 15 09
19	2 36 49	1 34 41	21 21 20	17 45 15	14 54 23	15 13 18	16 39 32	17 04 57
27	2 35 38	1 34 52	21 45 37	18 20 45	15 32 33	15 52 08	17 31 11	17 58 04
32	2 35 08	1 35 24	22 00 35	18 42 54	15 57 05	—	18 04 53	—

	Jan. 1	Feb. 26	April 23	June 18	Aug. 13	Oct. 8	Dec. 3	Dec. 32
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
URANUS	20 54 22	21 07 09	21 16 27	21 16 42	21 09 10	21 02 32	21 04 54	21 09 48
NEPTUNE	20 12 51	20 21 21	20 26 18	20 24 41	20 18 52	20 15 07	20 17 54	20 21 40
PLUTO	16 36 42	16 41 59	16 40 44	16 35 08	16 31 23	16 33 44	16 41 15	16 45 36

Interpolation

The longitudes of Moon and other fast moving planets calculated by the usual methods of simple proportion from their daily positions, for any intermediate hour of the day though fairly correct for our ordinary purposes are not strictly accurate. To obtain more precise result, further correction is to be applied to the longitude of planet already obtained by the rule of proportion.

Suppose *a. b. c. d* represent the longitudes of a planet for four successive days (for 5-30 A.M.I.S.T). and *l, m, n*, be the motions during the three intervals as indicated below. The longitude for any hour between the positions *b* and *c* is required to be calculated.

a	
	l
b	
	m
c	
	n
d	

Firstly find the longitude by utilising the position *b* and the daily motion *m* by the usual method.

Then apply interpolation. For this calculate (*n–l*) and take the result from the following table according to (*n-l*) and given time from 5.30 A. M. If (*n–l*) is positive, the correction would be negative and *vice versa*. i.e. the correction is of opposite sign to (*n–l*)

Correction due to second differences

Time interval	(*n–l*) 4'	8'	16'	24'	32'	40'	48'	56'	64'	Time interval
h *m*	0"	0"	0"	0' 0"	0' 0"	0' 0"	0' 0"	0' 0"	0' 0"	*h* *m*
0 18	1	2	3	0 5	0 6	0 8	0 9	0 11	0 12	24 00
0 37	2	3	6	0 9	0 12	0 15	0 18	0 21	0 24	23 42
0 56	2	5	9	0 14	0 18	0 23	0 27	0 32	0 36	23 23
1 16	3	6	12	0 18	0 24	0 30	0 36	0 42	0 48	23 04
1 36	4	8	15	0 23	0 30	0 38	0 45	0 53	1 0	22 44
1 58	4	9	18	0 27	0 36	0 45	0 54	1 3	1 12	22 24
2 20	5	11	21	0 32	0 42	0 53	1 3	1 14	1 24	22 02
2 42	6	12	24	0 36	0 48	1 0	1 12	1 24	1 36	21 40
3 06	7	14	27	0 41	0 54	1 8	1 21	1 35	1 48	21 18
3 31	7	15	30	0 45	1 0	1 15	1 30	1 45	2 0	20 54
3 57	8	17	33	0 50	1 6	1 23	1 39	1 56	2 12	20 29
4 25	9	18	36	0 54	1 12	1 30	1 48	2 6	2 24	20 03
4 54	10	20	39	0 59	1 18	1 38	1 57	2 17	2 36	19 35
5 26	10	21	42	1 3	1 24	1 45	2 6	2 27	2 48	19 06
6 00	11	23	45	1 8	1 30	1 53	2 15	2 38	3 0	18 34
6 38	12	24	48	1 12	1 36	2 0	2 24	2 48	3 12	18 00
7 21	13	25	51	1 17	1 42	2 8	2 33	2 59	3 24	17 22
8 12	13	27	54	1 21	1 48	2 15	2 42	3 9	3 36	16 39
9 19	14	29	57	1 26	1 54	2 23	2 51	3 20	3 48	15 48
12 00	15	30	60	1 30	2 0	2 30	3 0	3 30	4 0	14 41
										12 00

Method of Calculation

Example : Find the longitude of Moon on Sept. 23, 1999 at 5-30 p. m. I.S.T. from the given positions of Moon at 5-30 a.m. I.S.T. For this purpose positions of Moon from Sept. 22 to Sept. 25 are given below.

Position of Moon at 5-30 a. m. I.S.T

		s ° ' "	Diff ° ' "	
1999, Sept. 22	=	9 21 34 28		
			13 00 14	(=*l*)
23	=	10 04 34 42		
			13 23 26	(= *m*) (*n-l*) = +46' 01"
24	=	10 17 58 08		
			13 46 15	(= *n*)
25	=	11 01 44 23		

Moon's longitude on Sept. 23 at 5-30 a.m. IST = 10^s 04° 34' 42". Daily motion of Moon on that date=13°23'26". By rule of proportion or by using Log. Tables, the position of Moon at 5-30 p.m. is found to be 10^s11°16'25". The time interval from 5-30 a.m. is 12 hour. To obtain more accuracy, correction due to *second differences* according to time interval of 12 hours and (*n-l*) which is (+) 46' 01" is to be taken. From the Table given above, we get the correction as 2' 54". The correction will be of opposite sign to (*n-l*). As the (*n-l*) is positive the correction will be of opposite sign. So the final result will be 10^s11°16'25" (–) 2' 54" = 10^s11°13'31" (Actual figure is 10^s11°13'30").

Movement and Visibility of Planets in 1999

Mercury can be seen only when the planet is below in the eastern horizon before sunrise or low in the western horizon after sunset. It is visible in the mornings between the following approximate dates: Jan.1 to Jan.14, March 28 to May 10, Aug.4 to Aug.28 and Nov. 21 to Dec.26. The planet becomes brighter at the end of each period. It is visible in the evenings between the following approximate dates: Feb.17 to Mar.12, June 3 to July 14 and Sept.28 to Nov.7. The planet is brighter at the beginning of each period. During the remaining period of the year, the planet will remain invisible to the naked eye, as it will be too close to the Sun for observation. Mercury will transit the Sun's disc on November 15 from *h* 26-45 to *h* 27-37 I.S.T. The event will not be visible from India. It is in conjunction with Jupiter on May 1, with Saturn on May 13 and with Venus on Aug.26. It moves from ***Vrischika rasi*** and after going through the different signs of the zodiac it remains in ***Dhanu rasi*** at the end of the year.

Venus as a brilliant object will be visible in the evening sky from the beginning of year until middle of August when it becomes too close to the Sun for observation. It reappears as a morning star and can be seen until the end of the year. Venus remains invisible to the naked eye from Aug.10 to Aug.24 when it is too near the Sun for observation. Venus is in conjunction with Jupiter on Feb.23, with Saturn on Mar.20 and with Mercury on Aug.26. The planet is 7 degrees north of the star **Aldebaran** (***Rohini***) on April 21, 4 degrees south of the star ***Pollux*** (***Punarvasu***) on 30th May and 1.5 degrees south of the star ***Regulus*** (***Magha***) on July 13 and Oct.8. It attains greatest brilliancy on July 14 and Sept.26 when its visual magnitude will be –4.5. Venus moves from ***Makara rasi*** and after going through different signs of the zodiac remains in ***Vrishcika rasi*** at the end of the year.

Mars is visible throughout the year. It rises around midnight at the beginning of the year and is at opposition with the Sun on Apr.24, when it is visible throughout the night. It passes 4 degrees north of the star **Spica** (***Chitra***) on Jan.8 and 3 degrees north of the star **Antares** (***Jyestha***) on Sept.17. Mars approaches close to the Earth on May 1 when its distance will be about 537 lakh miles (nearest distance of Mars from Earth is however, 340 lakh miles). It moves from ***Kanya*** to ***Kumbha Rasi*** and remains in ***Kumbha rasi*** at the end of the year. It is retrograde from March 18 to June 4.

Jupiter at the beginning of the year can be seen in the evening sky. From third week of March it becomes too close to the Sun for observation being in conjunction with the Sun on April 1. It reappears in the morning sky from middle of April and from late July it can be seen for more than half of the night. It remains invisible to the naked eye from March 20 to April 18. It is at opposition with Sun on Oct.23, when it is visible throughout the night till end of the year. It is in conjunction with Venus on Feb.23 and with Mercury on May 1. It moves from ***Kumbha*** to ***Mesha rasi*** and remains in ***Mesha rasi*** at the end of the year. It is retrograde from Aug. 25 to Dec. 20.

Saturn is visible in the evening sky from the beginning of the year. It becomes too close to the Sun for observations during the second week of April being in conjuction with the Sun on April 27. It reappears in the morning sky in the third week of May. It remains invisible to the naked eye from April 13 to May 19. It is at opposition with the Sun on Nov.6 when it is visible throughout the night. For rest of the year it can be seen for more than half of the night. Saturn is in conjunction with Venus on March 20 and with Mercury on May 13. The planet remains in ***Mesha rasi*** during the year. It is retrograde from Aug. 30 to Jan.12 of next year.

Uranus is visible in the evening sky during first half of January. Thereafter it becomes too close to the Sun for observation until late Feb. when it reappears in the morning sky. It is at opposition with the Sun on Aug.7 and from early Nov. it can be seen in the evening sky. It remains in ***Makara rasi*** during the year. It is retrograde from May 21 to Oct.23.

Neptune is visible in the evening sky at the beginning of January. Thereafter it becomes to close to the Sun for observation until middle of Feb. when it reappears in the morning sky. It is at opposition on July 26 and from late Oct, it can be seen in the evening sky. It remains in ***Makara rasi*** during the year. It is retrograde from May 7 to Oct.14.

Planets at Minimum and Maximum distances from the Earth, 1999

	Nearest to the Earth (Near about Opposition with Sun)			Farthest from the Earth (Near about conjuntion with Sun)		
Planet	Date	Distance	Potency	Date	Distance	Potency
Sun	Jan. 3	0.983	1.000	July 6	1.017	0.967
Mercury	Mar. 23 July 23 Nov. 14	0.603 0.582 0.676	0.908 0.910 0.811	Jan. 27 May 24 Sept. 15	1.418 1.322 1.392	0.539 0.415 0.394
Venus	Aug. 20	0.288	0.917	—	—	—
Mars	May 1	0.578	0.644	—	—	—
Jupiter	Oct. 22	3.963	0.997	Apr. 2	5.950	0.664
Saturn	Nov. 6	8.206	0.980	Apr. 27	10.246	0.785

Note:- The distance are in units of the mean distance of the Sun from the Earth taken as 1.000. Potency or power of a planet that it exerts on us is taken as 1.00 when at the minimum possible distance from the Earth and decreases inversely as the distance increases. The least distance adopted are : Sun 0.983 (Jan. 3), Mercury 0.548 (June 8), Venus 0.264 (Jan. 3), Mars 0.372 (Aug. 29), Jupiter 3.951 (Oct. 7) and Saturn 8.039 (Dec. 24).

One astronomical unit is 149,597,870 km. (the average distance between the Earth and the Sun)
Mean distance of Sun from the Earth is 930 lakh miles. Time to reach light on Earth from the Sun is about 8.3 minutes

ECLIPSES IN 1999

In the year 1999, there are three eclipses, two of the Sun and one of the Moon. Details of the eclipses are given below in I. S. T. In addition, there will be a Penumbral eclipse of the Moon on January 31, Sunday.

	ANNULAR SOLAR ECLIPSE		PARTIAL LUNAR ECLIPSE		TOTAL SOLAR ECLIPSE	
	February 16 Tuesday		**July 28 Wednesday**		**August 11 Wednesday**	
	h	*m*	*h*	*m*	*h*	*m*
Eclipse begins	**9**	**22**	**15**	**52**	**13**	**56**
Totality or annularity begins	10	27	—		15	00
Maximum of eclipse	11	50	17	04	16	21
Totality or annularity ends	13	40	—		18	06
Eclipse ends	**14**	**45**	**18**	**16**	**19**	**10**
Total duration	5	23	2	24	5	14
Magnitude	—		0.402		—	
Moon enters penumbra	—		14	26	—	
Moon leaves penumbra	—		19	41	—	
	h	*m*	*h*	*m*	*h*	*m*
New Moon or Full Moon	12	09	16	55	16	39
Moon's Latitude	– 0° 28'		+ 0°. 44'		+ 0° 41'	
Moon's Longitude	10^s 03° 18'		9^s 11° 07'		3^s 24° 30'	
Moon–*Rahu* (Asc. Node)	184° 59'		172° 04'		5° 21'	
Visibility in India	**Not Visible**		**Visible**		**Visible**	

N.B.— Times of beginning and end of solar eclipses as shown above relate to the Earth as a whole and not to any particular locality.

Penumbral Eclipse of the Moon— January 31, Sunday. Moon enters Penumbra at 19*h* 35*m* and leaves Penumbra at 24*h* 00*m* on Jan. 31. Penumbral magnitude of the eclipse = 1.028.
— Visible in all parts of India.

VISIBILITY OF ECLIPSES

ANNULAR SOLAR ECLIPSE, FEBRUARY 16, TUESDAY :— The eclipse is visible in South Atlantic Ocean, southern part of Africa, Indian Ocean, Indonesia, Malayasia, southern part of Phillipines, Australasia and most of Antarctica — **Not visible in India.**

PARTIAL LUNAR ECLIPSE, JULY 28, WEDNESDAY :— The eclipse is visible in eastern Asia, Japan, Australia, New Zealand, Hawaii, North America except the north-eastern part, South America, Antarctica, eastern Indian Ocean and Pacific Ocean — **Visible in India.**

In India, the beginning of the lunar eclipse is not visible. The ending is only visible in the eastern and north-eastern parts of India where the partially eclipsed Moon rises. **Eclipse ends at *h* 18-16.** Moonrise times of certain places are : Agartala *h* 18-08, Aijawl 18-02, Guwahati *h* 18-07, Kohima *h* 18-01, Itanagar *h* 18-04, Shillong *h* 18-10, Port Blair *h* 17-43, Silchar *h* 18-04, Digboi *h* 17-57, Dibrugarh *h* 18-00. ***In Bangladesh :*** Dhakha *h* 18-12, Chittagong *h* 18-04, Comilla *h* 18-08, Khulna *h* 18-14, Cox Bazar *h* 18-02, Sylhet *h* 18-08.

TOTAL SOLAR ECLIPSE, AUGUST 11, WEDNESDAY :— The eclipse is visible in north-eastern parts of U.S.A., eastern parts of Canada, North Atlantic Ocean, Europe, United Kingdom, Scotland, Ireland, northern parts of Africa, Asia except the extreme eastern part and north Indian Ocean. **—Visible in all parts of India.**

Visibility of Total Solar eclipse of August 11, 1999 in India :

The path of totality of the solar eclipse of August 11 passes in India through Gujarat, Maharashtra, Madhya Prasesh, Andhra Pradesh and Orissa. The places where the phase of totality can be witnessed lie in the sequence of Anand, Vadodara, Bhuj, Nadiad, Surendranagar, Akola, Bhusawal, Jagdalpur, Koraput and Yeotmal.

Total Solar Eclipse, Aug. 11, 1999 — *contd.*

Table — I

Timings of total phase and beginning and end of the eclipse of certain places in the **path of totality** are given below in I.S.T.

Place	Eclipse begins			Totality begins			Totality ends			Magnitude	Eclipse ends		
	h	*m*	*s*	*h*	*m*	*s*	*h*	*m*	*s*		*h*	*m*	*s*
Anand	16	56	29	18	00	48	18	01	42	1.018	18	59	17
Bhuj	16	53	00	17	59	15	18	00	00	1.019	18	59	04
Borsad	16	56	32	18	00	48	18	01	53	1.018	18	59	24
Cambay	16	56	35	18	01	02	18	02	00	1.018	18	59	40
Dholka	16	55	50	18	00	27	18	01	22	1.019	18	59	11
Khambat	16	56	32	18	00	57	18	02	00	1.018	18	59	37
Kheda	16	56	00	18	00	40	18	01	11	1.018	18	59	06
Malia	16	54	24	17	59	38	18	00	39	1.019	18	58	55
Nadiad	16	56	12	18	00	47	18	01	18	1.018	18	59	08
Padra	16	56	58	18	01	05	18	02	11	1.018	18	59	35
Pallad	16	56	26	18	00	45	18	01	49	1.018	18	59	23
Surendranagar	16	55	18	18	00	14	18	01	21	1.019	18	59	22
Vadodara	16	56	58	18	01	03	18	02	07	1.018	18	59	30

Table — II

Some places where all the phases except the general ending of the eclipse is visible (as the Sun sets before the ending of the eclipse) are shown below with their timings in I.S.T.

Place	Eclipse begins			Totality begins			Totality ends			Magnitude	Sunset	
	h	*m*	*s*	*h*	*m*	*s*	*h*	*m*	*s*		*h*	*m*
Akola	17	01	26	18	03	24	18	04	21	1.017	18	54.2
Bhusawal	17	00	19	18	03	01	18	03	51	1.017	18	59.6
Jagdalpur	17	05	33	18	04	59	18	05	51	1.015	18	32.0
Jalgaon	17	00	11	18	02	56	18	03	47	1.017	19	00.1
Koraput	17	06	05	18	05	13	18	06	02	1.015	18	29.1
Mul	17	03	29	18	04	11	18	04	55	1.016	18	42.6
Palkonda	17	06	38	18	05	15	18	06	04	1.015	18	24.5
Rajura	17	03	47	18	04	34	18	05	17	1.016	18	43.4
Salur	17	06	35	18	05	35	18	06	07	1.014	18	26.5
Srikakulam	17	07	03	18	05	43	18	06	13	1.015	18	23.5
Tekkali	17	06	44	18	05	17	18	05	53	1.014	18	21.6
Yeotmal	17	02	29	18	03	45	18	04	43	1.017	18	49.3

The eclipse will be visible as a partial one from regions outside the path of totality.

Table — III

Some places where both the beginning and ending of the partial phases will be visible are shown below with their timings in I.S.T.

Place	Eclipse begins		Eclipse ends		Magnitude at greatest phase	Place	Eclipse begins		Eclipse ends		Magnitude at greatest phase
	h	*m*	*h*	*m*			*h*	*m*	*h*	*m*	
Agra	16	54	18	52	0.854	Indore	16	58	18	58	0.973
Ahmedabad	16	56	18	59	0.996	Jaipur	16	52	18	53	0.879
Ajmer	16	52	18	54	0.899	Jodhpur	16	51	18	55	0.917
Amritsar	16	46	18	46	0.787	Junagadh	16	56	19	01	0.968
Bhavnagar	16	57	19	00	0.989	Mumbai	17	02	19	03	0.927
Bikaner	16	49	18	52	0.877	Nasik	17	01	19	02	0.962
Chandigarh	16	48	18	47	0.788	Pune	17	03	19	03	0.926
Dehradun	16	50	18	47	0.787	Rajkot	16	55	19	00	0.989
Delhi	16	51	18	50	0.829	Shimla	16	48	18	46	0.778
Dwarka	16	54	19	00	0.974	Srinagar	16	42	18	42	0.738
Gwalior	16	55	18	53	0.873	Udaipur (SO)	16	54	18	57	0.950
Haridwar	16	50	18	48	0.794	Ujjain	16	57	18	58	0.963

Total Solar Eclipse, Aug. 11, 1999 — *contd.*

Table — IV

Some places where the beginning of the eclipse and setting of the eclipsed Sun will be visible are shown below with their timings in I.S.T.

Place	Eclipse begins		Sunset		Duration upto sunset	Place	Eclipse begins		Sunset		Duration upto sunset
	h	*m*	*h*	*m*	*m*		*h*	*m*	*h*	*m*	*m*
Agartala	17	02	18	01	59	Mysore	17	13	18	53	100
Allahabad	16	58	18	41	103	Nagpur	17	02	18	47	105
Aijawl	17	03	17	55	52	Panaji	17	07	19	01	114
Bangalore	17	12	18	43	91	Patna	16	59	18	28	89
Bhopal	16	58	18	56	118	Pondicherry	17	14	18	32	78
Bhubaneswar	17	05	18	18	73	Port Blair	17	15	17	40	25
Calcutta	17	03	18	11	68	Puri	17	06	18	18	72
Chennai	17	13	18	32	79	Raipur	17	03	18	36	93
Dhanbad	17	01	18	21	80	Rajahmundry	17	08	18	31	83
Gangtok	16	58	18	17	79	Ranchi	17	02	18	25	83
Gaya	17	00	18	28	88	Shillong	17	01	18	01	60
Guwahati	17	00	18	03	63	Sholapur	17	05	18	55	110
Hyderabad	17	07	18	44	97	Silchar	17	02	17	57	55
Imphal	17	02	17	52	50	Tirupati	17	12	18	36	84
Itanagar	17	00	17	56	56	Thiruvanantha-puram	17	19	18	40	81
Jabalpur	17	00	18	46	106	Varanasi	16	58	18	36	98
Kanpur	16	56	18	49	113	Vijayawada	17	08	18	35	87
Kohima	17	01	17	53	52	Visakhapatnam	17	08	18	25	77
Lucknow	16	56	18	48	112						

Note : The eclipse ends after sunset at the above places. The greatest phase of the eclipse occurs after sunset at the above places.

Visibility of Total Solar eclipse in the neighbouring Countries

(Time in I.S.T.)

Place	Eclipse begins	Totality begins	Totality ends	Magnitude	Eclipse ends
	h m				
Dhaka	17 02	—	—	0.839	—
Chittagong	17 04	—	—	0.861	—
	h m s	*h m s*	*h m s*		*h m*
Karachi	16 48 05	17 55 54	17 57 11	1.020	18 57
Lahore	16 45	—	—	0.793	18 46
Rawalpindi	16 41	—	—	0.764	18 43
Kathmandu	16 57	—	—	0.786	—
Thimpu	16 58	—	—	0.761	—
Colombo	17 22	—	—	0.670	—
Jaffna	17 18	—	—	0.747	—
Rangoon	17 09	—	—	0.970	—

"—" in the last column means the eclipse ends after sunset

TRANSIT OF MERCURY

November 15, 1999

A transit of Mercury over the disc of the Sun will occur on November 15 from *h* 26-45 to *h* 27-37 I.S.T. A *complete transit* will be visible in extreme eastern Asia, north eastern Australia, most of the North Island of New Zealand, North America except the northeast portion, western South America, most of the North Pacific Ocean and the northern south Pacific Ocean. A *partial transit* will be visible in central and southern Australia, the South Island of New Zealand, Antarctica and the southern South Pacific Ocean. — **Not Visible in India.**

Mean Places of STARS for 1999.0, i.e. on Jan. 0.791 U. T. = Jan. 1, 0*h* 29.0*m* I.S.T.

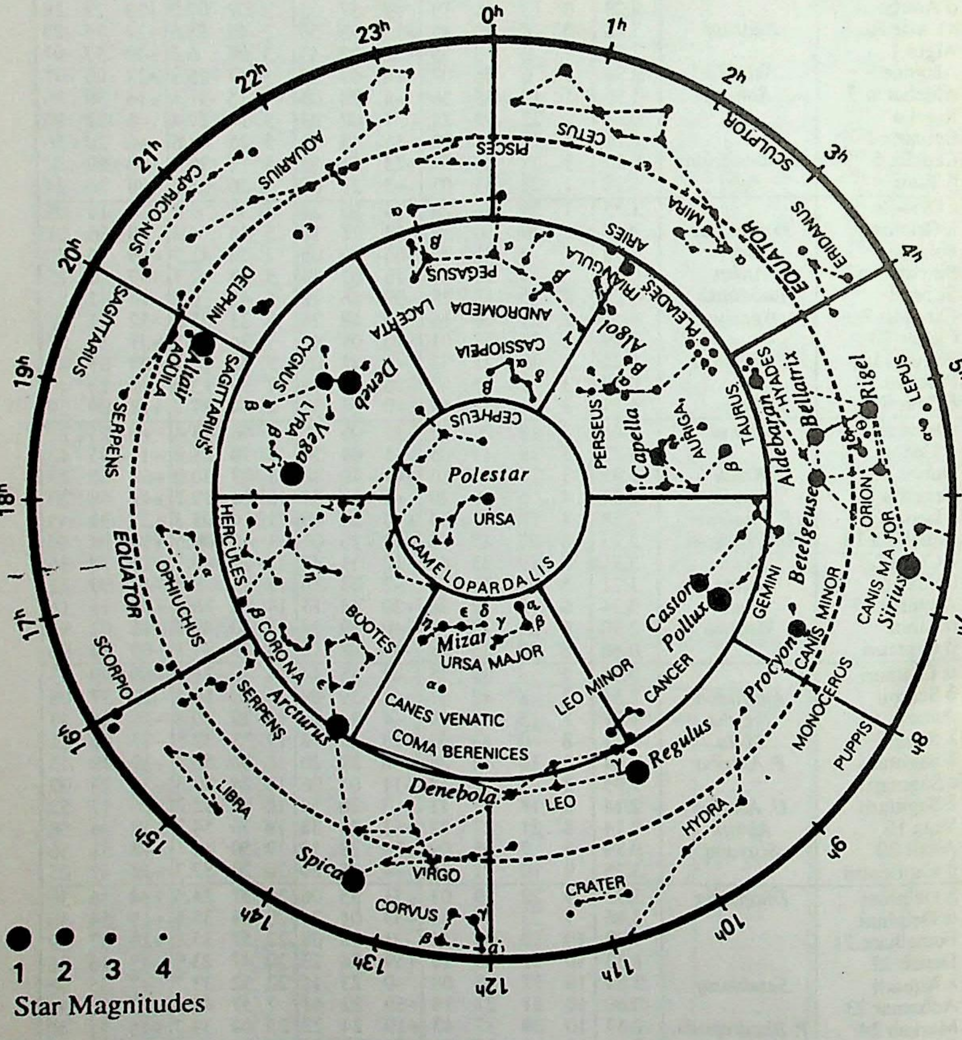
N. B. Tropical or Sayana Long. = Nirayana long. +23° 50' 35".3 *viz. (Mean Ayanamsa)*

STAR	Indian Name	Mag.	Nirayana Longitude				Latitude			Right Ascension			Declination		
			s	°	'	"	°	'	"	h	m	s	°	'	"
β Arietis	*Asvini*	2.72	0	10	06	47	+8	29	14	1	54	35.1	+20	48	11
α Arietis	...	2.23	0	13	48	19	+9	57	55	2	07	07.0	+23	27	28
41 Arietis	*Bharani*	3.68	0	24	20	47	+10	26	59	2	49	55.5	+27	15	23
Algol 1	...	2.7v	1	2	18	38	+22	25	43	3	08	6.2	+40	57	07
Alcyone 2	*Krittika*	2.96	1	6	08	07	+4	03	03	3	47	25.5	+24	06	07
Aldebaran 3	*Rohini*	1.06	1	15	55	56	–5	28	03	4	35	51.8	+16	30	26
Rigel 4	...	0.34	1	22	58	21	–31	07	23	5	14	29.4	–8	12	10
Bellatrix 5	...	1.70	1	27	05	22	–16	48	58	5	25	4.6	+6	20	56
Capella 6	*Brahmahriday*	0.21	1	28	00	03	+22	51	52	5	16	36.9	+45	59	50
β Tauri	*Agni*	1.78	1	28	43	05	+5	23	06	5	26	13.7	+28	36	24
ε Orionis	...	1.75	1	29	36	24	–24	30	24	5	36	9.8	–1	12	09
λ Orionis	*Mrigasiras*	3.66	1	29	50	59	–13	22	11	5	35	4.9	+9	56	01
Polaris	*Dhruva*	2.1v	2	4	42	37	+66	06	05	2	30	41.7	+89	15	35
Betelguese 7	*Ardra*	0.6v	2	4	53	51	–16	01	38	5	55	7.1	+7	24	25
Sirius 8	*Lubdhaka*	–1.58	2	20	13	29	–39	36	18	6	45	6.2	–16	42	53
Canopus 9	*Agastya*	–0.86	2	21	06	16	–75	49	26	6	23	55.8	–52	41	42
Castor 10	...	1.99	2	26	23	01	+10	05	45	7	34	32.2	+31	53	27
Pollux 11	*Punarvasu*	1.21	2	29	21	32	+6	41	03	7	45	15.3	+28	01	43
Procyon 12	...	0.48	3	1	55	43	–16	01	10	7	39	15.0	+5	13	40
δ Cancri	*Pusya*	4.17	3	14	51	54	+0	04	37	8	44	37.7	+18	09	29
ε Hydrae	*Aslesa*	3.48	3	18	29	17	–11	06	15	8	46	43.4	+6	25	21
α Cancri	"	4.27	3	19	47	05	–5	04	50	8	58	25.9	+11	51	42
Dubhe 13	*Kratu*	1.95	3	21	20	26	+49	40	48	11	03	40.0	+61	45	23
Regulus 14	*Magha*	1.34	4	5	58	20	+0	27	53	10	08	19.1	+11	58	20
δ Leonis	*P. Phalguni*	2.58	4	17	27	34	+14	20	00	11	14	03.3	+20	31	45
Denebola 15	*U. Phalguni*	2.23	4	27	45	38	+12	16	01	11	49	00.5	+14	34	40
δ Corvi	*Hasta*	3.11	5	19	35	41	–12	11	47	12	29	48.7	–16	30	36
Spica 16	*Citra*	1.21	5	29	59	03	–2	03	16	13	25	8.4	–11	09	22
Arcturus 17	*Svati*	0.24	6	0	22	36	+30	44	13	14	15	36.9	+19	11	15
α Libra	*Visakha*	2.90	6	21	13	32	+0	19	59	14	50	49.4	–16	02	16
β Centauri	...	0.86	6	29	56	08	–44	08	15	14	03	45.1	–60	22	06
α Centauri	...	0.06	7	5	37	25	–42	35	44	14	39	31.8	–60	49	53
δ Scorpii	*Anuradha*	2.54	7	8	42	51	–1	59	09	16	00	16.4	–22	37	08
Antares 18	*Jyestha*	1.2v	7	15	54	19	–4	34	11	16	29	20.8	–26	25	47
λ Scorpii	*Mula*	1.71	8	0	43	43	–13	47	18	17	33	32.5	–37	06	11
δ Sagittarii	*P. Asadha*	2.84	8	10	43	26	–6	28	20	18	20	55.8	–29	49	43
ε Sagittarii	...	1.95	8	11	13	18	–11	03	06	18	24	06.3	–34	23	07
δ Sagittarii	*U. Asadha*	2.14	8	18	31	41	–3	26	58	18	55	12.2	–26	17	53
Vega 19	*Abhijit*	0.14	8	21	27	32	+61	43	58	18	36	54.3	+38	46	58
Altair 20	*Sravana*	0.89	9	7	55	09	+29	18	13	19	50	44.1	+8	51	56
β Capricorni	...	3.25	9	10	11	25	+4	35	20	20	20	57.3	–14	47	05
β Delphini	*Dhanistha*	3.72	9	22	29	03	+31	55	06	20	37	24.5	+14	35	30
α Delphini	...	3.86	9	23	31	24	+33	01	21	20	39	35.5	+15	54	30
Fomalhaut 21	...	1.29	10	10	00	11	–21	08	08	22	57	35.8	–29	37	39
Deneb 22	...	1.33	10	11	28	20	+59	54	23	20	41	23.9	+45	16	36
λ Aquarii	*Satabhisaj*	3.84	10	17	43	08	–0	23	11	22	52	33.7	–7	35	06
Achernar 23	...	0.60	10	21	27	16	–59	22	41	1	37	40.6	–57	14	30
Markab 24	*P. Bhadrapada*	2.57	10	29	37	43	+19	24	22	23	04	39.7	+15	11	40
β Pegasi	...	2.6v	11	5	31	02	+31	08	26	23	03	43.5	+28	04	39
γ Pegasi	*U. Bhadrapada*	2.87	11	15	17	56	+12	36	00	0	13	11.1	+15	10	41
α Andromeda	...	2.15	11	20	27	05	+25	40	50	0	08	20.2	+29	05	05
ζ Piscium	*Revati*	5.57	11	26	01	14	–0	12	48	1	13	40.7	+7	34	12

1. β Persei
2. η Tauri
3. α Tauri
4. β Orionis
5. γ Orionis
6. α Aurigae
7. α Orionis
8. α Canis Majoris
9. α Carinae.
10. α Germinorum
11. β Germinorum
12. α Canis Minoris
13. α Ursae Majoris
14. α Leonis
15. β Leonis
16. α Virginis
17. α Bootis
18. α Scorpii
19. α Lyrae
20. α Aquilae.
21. α Piscis Austrini.
22. α Cygni.
23. α Eridani
24. α Pegasi.

The Northern Sky

(Extended up to 25° South of the Equator)



(The numerals around the edge of the circle indicates **Right Ascension**)

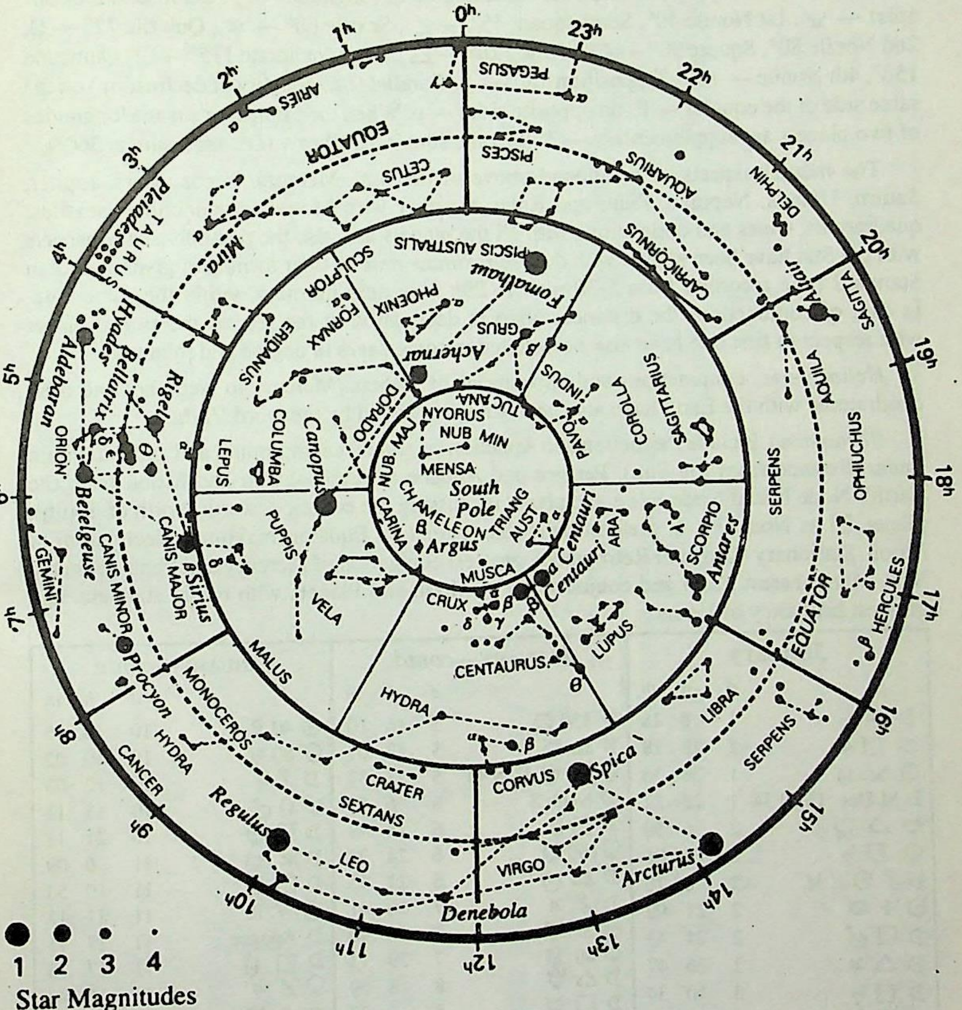
Dotted line indicate Equator

Bright Stars

Vega, Capella, Arcturus, Procyon, Altair, Betelgeuse, Aldebaran, Pollux, Regulus, Sirius

The Southern Sky

(Extended up to 25° North of the Equator)



(The numerals around the edge of the circle indicates **Right Ascension**)

Dotted line indicate Equator

Bright Stars

Canopus (Agastya), Alpha Centauri, Beta Centauri, Rigel, Achernar, Antares, Fomulhaut, Spica, Alpha Crucis, Deneb

Aspects & Phenomena, in 1999

Approximate time of the formation of Aspects and Phenomena in I.S.T.

Aspects :— Conjunction or on the same degree of longitude —☌, Semi sextile or 30° apart — ⚺, 1st Nonile 40°, Semi-square 45° — ∠, Sextile 60° — ⚹, Quintile 72° — Q, 2nd Nonile 80°, Square 90° — □, Trine 120° — △, Sesquiquadrate 135° —⚼, Quincunc 150°, 4th Nonile — 160°, Opposition 180° —☍, Parallel (*i.e.*, equality of declination) on the same side of the equator — P, on opposite sides — p. When the tropical or sayana longitudes of two planets are supplementary — V (*i.e.*, the sum is 180°) or v (*i.e.*, their sum is 360°).

The mutual aspects as mentioned above of the Sun, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto and Rahu, together with Moon's conjunctions, sextiles, quadratures, trines and oppositions with all the planets and also the parallels and V-aspects with the Sun have been shown with the *approximate time* of their formation given in Indian Standard time recorded from 5-30 a.m. to 29*h* 29*m* next morning within the same date. In case of conjunctions the distances apart in declination of the second mentioned planet with respect to first one have also been stated in some cases in degree and minutes.

Heliocentric conjunctions and oppositions of planets (Mercury to Neptune) and their quadratures with the Earth have also been shown prefixed by the word *'Helio'*.

Phenomena include Perihelion and Aphelion (*viz.* planet at minimum and and maximum linear distance from the Sun), Perigee and Apogee (in case of Sun and Moon from the Earth), Node N and Node S (*i.e.* the planet is crossing the ecliptic towards North of South), planet □ its Node, *i.e.* at greatest helio, lat., planet on Equator, maximum declination of Moon, Stationary (Direct or Retrograde), greatest elongation of Mercury and Venus from the Sun, Mars nearest Earth and conjunctions of Moon and Planets with bright stars etc. and greatest brilliancy of Venus.

January	d	h	m	JANUARY—*contd.*	d	h	m	JANUARY—*contd.*	d	h	m
☽ ⚹ ♄	1	8	28	♃ 150 ☊	5	16	10	☉ 40 ♇	10	8	45
☿ □ ♃	1	18	18	☽ △ ☿	5	17	07	♀ 80 ♄	10	10	02
☉ ⚺ ♅	1	26	36	♀ ☌ ♆ 1° N 44'	5	21	37	☽ ☍ ♄	10	12	03
☽ M.Dec. 19°N 34'	1	28	22	☿ Node S	6	6	56	☿ Q ♂	10	15	11
☿ △ ☊	2	6	50	☽ □ ♇	6	14	41	☽ □ ♆	10	21	11
♀ □ ♄	2	8	06	♀ 160 ☊	6	24	34	☽ ⚹ ☿	11	6	09
☽ ☍ ☉ *F. M.*	2	8	20	☽ △ ☉	6	27	35	☽ □ ♀	11	10	53
☉ P ☿	2	21	02	☽ ☍ ♃	7	16	41	☉ V ♇	11	11	13
☽ □ ♂	2	21	43	☿ ⚺ ♆	7	28	40	☽ Apogee	11	17	11
☽ △ ♃	2	26	47	☿ 40 ♅	7	29	13	☽ □ ♅	11	17	38
☽ □ ♄	3	10	34	☽ △ ♆	8	8	59	♀ ∠ ♃	11	18	48
☽ ☍ ♀	3	13	10	☽ □ ☿	8	9	33	♀ P ♆	11	19	24
☽ ☍ ♆	3	18	05	☽ △ ♀	8	15	39	♂ 150 ♃	12	6	55
☉ Perigee	3	18	36	☽ Equat S	8	23	34	☿ ⚼ ☊	12	10	03
☽ △ ♇	4	8	03	☽ ⚹ ♇	8	24	55	♀ ⚹ ♇	12	11	45
☽ ☍ ♅	4	11	26	♂ 4°N *Spica*	8	27	30	☽ ⚹ ☉	12	14	10
☿ ∠ ♅	4	15	47	☽ △ ♅	8	28	54	☽ □ ☊	12	15	59
☿ △ ♄	4	26	59	☿ 80 ♃	9	11	53	☽ △ ♃	12	18	22
☽ ⚹ ♂	4	27	43	☽ □ ☉	9	19	52	☽ ⚹ ♆	13	9	54
☽ ☌ ☊	5	7	50	☽ ☌ ♂ 2°S 42'	9	27	33	☉ 150 ☊	13	10	35
☽ △ ♄	5	15	35	☽ ⚹ ☊	9	27	34	☿ ⚺ ♇	13	16	10
				♂ ⚹ ☊	9	27	47	☽ V ☉	13	20	51

JANUARY—*contd.*

	d	*h*	*m*
☽ ☌ ♇	13	25	52
♂ ∠ ♇	13	26	44
♀ ☌ ♅ 0°N 56'	14	5	30
☽ ✱ ♅	14	6	06
☽ ✱ ♀	14	6	12
☉ ✱ ♃	14	24	48
☿ ⚺ ♅	14	26	32
☽ △ ☊	14	27	12
☽ □ ♄	15	6	44
☽ ✱ ♂	15	8	26
☉ ∠ ♇	15	10	23
☿ Q ♃	15	10	46
☽ △ ♄	15	12	11
☿ Aphelion	15	26	56
☉ □ ♂	16	9	41
♀ 40 ♃	16	10	18
☽ M. Dec. 19°S 33'	16	10	34
♀ P ♅	16	18	42
☽ ☌ ☿ 4°S 25'	16	21	40
♀ Q ♄	16	22	55
♂ p ♄	16	26	30
☽ ✱ ♃	17	16	41
☽ □ ♂	17	19	35
☽ ☌ ☉ *N. M.*	17	21	16
☽ □ ♄	17	21	15
☉ □ ♄	17	21	49
☿ 80 ♂	17	25	55
☽ ☌ ♆ 1°S 33'	18	6	27
☿ ⚺ ♀	18	14	21
☽ ✱ ♇	18	20	25
☽ ☌ ♅ 1°S 35'	18	25	24
☽ ☌ ♀ 1°S 58'	19	12	05
☽ ☍ ☊	19	19	07
♂ ☍ ♃	19	25	20
☽ ✱ ♄	19	28	07
☽ △ ♂	19	28	14
☿ 40 ♇	20	5	45
☿ v ♇	20	14	10
☽ □ ♇	20	26	27
☿ 150 ☊	21	19	17
☽ ✱ ☿	21	24	58
☽ ☌ ♃ 1°N 48'	22	6	04
♀ Q ♇	22	7	28
☉ ☌ ♆	22	13	53
♀ ☍ ☊	22	16	12
☽ ✱ ♆	22	17	07
☽ ✱ ☉	22	17	23
☉ 160 ☊	22	22	42
☽ Equat N	22	29	17

JANUARY—*contd.*

	d	*h*	*m*
☽ △ ♇	23	6	51
☿ ∠ ♇	23	10	18
☽ ✱ ♅	23	10	56
☿ ✱ ♃	23	25	36
Helio ⊕ □ ♄	*23*	*27*	*03*
☽ △ ☊	23	28	09
Helio ♀ ☍ ♂	*23*	*28*	*28*
☽ ✱ ♀	24	7	37
☽ □ ☿	24	11	23
☽ ☌ ♄ 2°N 28'	24	12	54
☽ ☍ ♂	24	15	55
☽ □ ♆	24	20	39
☿ □ ♄	24	24	42
☽ □ ☉	24	24	45
☽ □ ♅	25	14	12
♀ ⚺ ♃	25	20	08
☽ □ ☊	26	6	56
☽ v ☉	26	10	17
♂ 40 ♇	26	10	43
☽ ✱ ♃	26	13	48
☿ □ ♂	26	14	15
☽ □ ♀	26	15	14
☽ △ ☿	26	20	38
♀ ✱ ♄	26	21	23
☽ △ ♆	26	23	23
☽ Perigee	26	26	56
☽ △ ☉	27	7	10
☽ 0°.5 S *Aldebaran* *Occultation*	27	12	30
☽ ☍ ♇	27	12	38
☽ △ ♅	27	16	53
☿ ☌ ♆ 2°N 18'	27	20	50
☿ 160 ☊	27	22	55
☉ 80 ♄	27	28	16
☽ p ☉	27	29	01
♀ v ♂	28	8	39
☽ ✱ ☊	28	9	16
☽ □ ♃	28	16	58
☽ ✱ ♄	28	18	23
♀ 80 ♇	28	20	37
☽ △ ♀	28	22	32
☽ △ ♂	28	24	00
☽ M.Dec. 19°N 32'	29	14	01
♀ △ ♂	29	22	26
♆ 160 ☊	29	23	30
☉ ✱ ♇	30	13	54
♀ ⚺ ♆	30	15	22
♀ v ♄	30	17	57
☽ △ ♃	30	20	54

JANUARY—*concld.*

	d	*h*	*m*
☽ □ ♄	30	21	49
☉ P ♅	30	24	42
☽ □ ♂	30	28	51
☽ ☍ ♆	31	5	34
☿ 80 ☊	31	6	14
☽ p ☉	31	9	32
Helio ☿ ☌ ♆	*31*	*12*	*50*
☽ ☍ ☿	31	16	38
☽ △ ♇	31	19	21
☽ ☍ ☉ F. M.	31	21	37
☽ ☍ ♅	31	24	03

February

	d	*h*	*m*
Helio ♀ ☌ ♃	*1*	*8*	*44*
♂ □ ♆	1	8	56
☿ ✱ ♇	1	14	41
☽ ☌ ☊	1	16	48
☽ △ ♄	1	27	13
☉ ∠ ♃	1	29	00
☽ 0°.3 S *Regulus* *Occultation*	2	6	30
☉ ☌ ♅	2	7	29
☿ P ♆	2	9	38
☽ ✱ ♂	2	12	03
☽ ☍ ♀	2	18	17
♃ ∠ ♅	2	21	30
♀ P ♇	2	23	43
☽ □ ♇	2	25	41
♀ P ♂	2	27	30
☿ ☌ ♅ 1°N 31'	3	5	30
☿ ∠ ♃	3	6	17
♃ ⚺ ♄	3	11	30
♂ P ♇	3	19	13
Helio ☿ ☌ ♅	*3*	*19*	*40*
☉ ☌ ☿ Sup.	4	10	48
☽ ☍ ♃	4	11	51
☽ △ ♆	4	20	02
☿ Q ♄	4	25	42
☽ Equat S	5	8	51
☽ ✱ ♇	5	11	08
☉ Q ♄	5	13	05
☽ △ ♅	5	16	45
☿ P ♅	5	22	45
☽ △ ☉	5	23	39
♀ □ ♇	5	24	58
☽ △ ☿	5	26	19
☽ ✱ ☊	6	10	56
☿ 40 ♃	6	12	13
♂ Q ☊	6	13	54

FEBRUARY—*contd.*	*d*	*h*	*m*
☽☍♄	6	22	54
♀ p ♄	6	27	11
☽□♆	7	7	31
☽☌♂ 3°S	7	11	35
♀ 160 ☊	7	16	12
♀ 40 ♆	7	22	30
☽ v ☉	7	25	35
☽△♀	7	28	22
☽□♅	7	29	02
♀⊻♅	8	10	55
☉ 40 ♃	8	10	00
☿☍☊	8	12	54
☿ Q ♇	8	13	12
♀∠♄	8	13	23
☽ Apogee	8	14	21
☽□☉	8	17	28
☽□☊	8	23	18
☽□☿	8	25	08
☽△♃	9	13	29
☽ P ☉	9	13	30
☽✱♆	9	20	13
☿ v ♂	9	22	37
☽☌♇	10	11	35
☽✱♅	10	17	38
☽□♀	10	23	37
☉ P ☿	10	28	21
☽✱☉	11	11	05
☽△☊	11	11	17
☉☍☊	11	14	09
☉ Q ♇	11	15	40
☽✱☿	11	23	27
☽△♄	11	23	43
☿✱♄	11	25	21
☽□♃	11	26	09
♀∠♆	11	26	10
☽✱♂	12	14	33
☿⊻♃	12	19	36
♀ 40 ♄	12	20	15
☽ M.Dec.19°S 31'	12	20	25
☿ 80 ♇	12	24	13
☉ V ♂	12	25	36
☿ v ♃	13	14	54
☽✱♀	13	16	01
☿⊻♆	14	8	23
☽□♄	14	9	00
☽✱♃	14	11	53
☿ P ♂	14	14	55
☽☌♆ 1°S 29'	14	16	21
☽□♂	14	24	02

FEBRUARY—*contd.*	*d*	*h*	*m*
☽✱♇	15	6	11
☽☌♅ 1°S 27'	15	11	57
♀⚼♂	15	17	30
♀ 150 ☊	15	18	09
Helio ☿☍♂	*15*	*27*	*06*
☽☍☊	15	27	24
☿ P ♇	15	28	28
☽☌☉ *N.M.*			
☉ Eclipse	16	12	09
☽ P ☉	16	14	40
☽✱♄	16	15	08
♀ 40 ♅	16	22	04
☿△♂	16	23	14
Helio ☿☌♃	*16*	*23*	*53*
☽△♂	17	6	19
☽☌☿ 0°N 15'	17	7	15
☽□♇	17	11	01
☉ P ♂	17	17	30
♂ v ☊	17	26	30
☿ p ♄	17	28	33
☉✱♄	18	8	33
☿□♇	18	12	23
☽☌♀ 1°N 51'	18	13	11
☽☌♄ 2°N 21'	18	22	43
☽✱♆	18	25	26
Helio ♀☌♄	*19*	*8*	*20*
☽ Equat N	19	11	43
☿ 160 ☊	19	12	33
☽△♇	19	14	01
☉ 80 ♇	19	16	42
☽✱♅	19	19	47
☿ 40 ♆	19	22	29
☉ v ♄	19	27	42
☽△☊	20	9	48
☿⊻♅	20	10	48
☿∠♄	20	16	05
♀ v ♃	20	17	47
☽ Perigee	20	20	03
☽ v ☉	20	20	26
☽☌♄ 2°N 41'	20	21	41
☉⊻♃	20	25	25
☽✱☉	20	25	55
♀∠♅	20	27	49
☽□♆	20	27	54
♀⊻♄	21	12	12
☽☍♂	21	13	39
☽ p ☉	21	20	06
☽□♅	21	22	17
Helio ☿☌♄	*21*	*26*	*19*
☽✱☿	21	27	07

FEBRUARY—*concld.*	*d*	*h*	*m*
☉⊻♆	22	7	09
☽□☊	22	12	03
☿∠♆	22	20	14
Helio ☿☌♀	*22*	*26*	*50*
☽✱♀	22	27	36
☽✱♃	22	29	09
☽△♆	23	6	30
☽□☉	23	8	13
☿ 40 ♄	23	17	07
☽ 0° 4 S *Aldebaran Occultation*	23	18	30
☽☍♇	23	19	04
♀ Equat N	23	22	32
☽△♅	23	25	12
♀☌♃ 0°.1S	23	25	18
☽□☿	24	12	53
♀✱♆	24	13	50
☽✱☊	24	15	05
♃ Equat N	24	17	30
☿ Node N	24	22	54
☽✱♄	24	27	58
☿ 150 ☊	25	7	51
☽□♃	25	9	22
☽□♀	25	11	56
☉ p ♄	25	14	30
☽△☉	25	15	39
☽ M. Dec.19°N32'	25	20	37
☽△♂	25	21	38
☿ 40 ♅	26	15	50
☿ v ♀	26	17	43
☽△☿	26	23	45
☿ p ♀	26	24	20
♃✱♆	27	5	30
☿⚼♂	27	6	30
☽□♄	27	8	55
☽☍♆	27	14	55
☽△♄	27	15	03
Helio ⊕□☿	*27*	*16*	*54*
Helio ♂☍♃	*27*	*19*	*40*
♀□☊	27	21	56
☽△♀	27	22	05
☽□♂	27	27	35
☽△♇	27	27	57
☿ v ♃	28	8	36
☽☍♅	28	10	49
☿ p ♃	28	17	11
☽☌☊	28	25	12
☿ Perihelion	28	26	33
☿ Equat N	28	26	46

March

	d	h	m
♂ ⚺ ♇	1	5	30
☽ 0°.2 S *Regulus* *Occultation*	1	15	30
☽ △ ♄	1	15	41
☉ □ ♇	1	17	30
☿ P ♃	1	18	50
☉ △ ♂	1	20	12
☽ □ ♇	2	11	03
☽ ✱ ♂	2	11	28
☽ ☍ ☉ *F.M.*	2	12	29
♀ △ ♇	2	14	23
☿ ∠ ♅	2	14	39
♀ 150 ♂	2	19	59
☽ p ☉	2	23	03
☿ ⚺ ♄	3	9	07
☉ 160 ☊	3	9	19
☿ Gt. Elong. 18°E	3	18	25
☽ ☍ ☿	3	25	48
☽ △ ♆	4	6	27
☽ ☍ ♃	4	8	27
☉ 40 ♆	4	14	11
☽ Equat S	4	17	15
☽ ✱ ♇	4	20	23
☽ ☍ ♀	4	26	18
☽ △ ♅	4	28	14
☽ v ☉	5	7	07
☽ ✱ ☊	5	18	59
☉ ⚺ ♅	5	19	24
♀ ✱ ♅	5	22	39
☽ P ☉	5	28	46
☉ v ♀	6	6	56
☽ ☍ ♄	6	11	55
☉ ⚺ ♀	6	12	53
♀ Q ♆	6	14	58
☽ □ ♆	6	17	39
☉ ∠ ♄	6	19	43
☉ p ♀	6	20	46
☽ ☌ ♂ 3°S 05'	7	9	48
☽ □ ♅	7	16	14
☿ ✱ ♆	7	17	30
☽ △ ☉	7	20	08
☽ □ ☊	8	6	46
Helio ☿ ☍ ♆	*8*	*10*	*03*
☽ Apogee	8	10	38
☽ ✱ ♆	9	6	14
☽ △ ☿	9	7	12
☽ △ ♃	9	10	26
☉ ∠ ♆	9	17	30
☽ ☌ ♇	9	20	25

March—*contd.*

	d	h	m
☉ p ☿	9	28	10
☽ ✱ ♅	9	29	02
Helio ☿ ☍ ♅	*10*	*9*	*08*
☽ □ ☉	10	14	10
☿ Retrograde	10	14	44
♂ 80 ☊	10	15	47
☽ △ ♀	10	16	08
☽ △ ☊	10	19	04
☿ □ Node	11	8	18
☽ △ ♄	11	13	25
☽ □ ☿	11	19	04
♀ △ ☊	11	21	30
☽ □ ♃	11	23	23
♀ 160 ♂	11	23	51
☽ M.Dec. 19°S 35'	11	29	18
☉ 40 ♄	12	9	57
☽ ✱ ♂	12	10	43
☉ 150 ☊	12	26	36
☿ ✱ ♆	13	5	30
☽ ✱ ☉	13	5	58
☽ □ ♀	13	9	00
☽ □ ♄	13	23	24
♇ Retrograde	13	26	37
☽ ✱ ☿	13	26	53
☽ ☌ ♆ 1°S 22'	13	27	40
☽ ✱ ♃	14	9	23
♂ v ♃	14	12	19
☽ ✱ ♇	14	16	15
☽ □ ♂	14	19	10
☽ ☌ ♅ 1°S 17'	14	24	26
♃ ⚼ ☊	14	25	48
♀ P ♄	15	5	30
☽ ☍ ☊	15	12	44
☽ ✱ ♀	15	21	04
♀ Q ♅	15	29	09
☽ ✱ ♄	16	5	42
☉ 40 ♅	16	8	27
♀ p ♇	16	9	38
☉ p ♃	16	13	47
☿ ⚺ ♄	16	15	12
☽ □ ♇	16	20	59
☽ △ ♂	16	23	51
☽ ☌ ☉ *N.M.*	17	24	18
♀ Node N	17	29	00
☽ ☌ ☿ 7°N 10'	18	6	13
☿ ∠ ♅	18	10	18
☽ v ☉	18	10	23
☽ ✱ ♆	18	11	48
☉ ⚼ ♂	18	11	54

March—*contd.*

	d	h	m
☿ ⚺ ♀	18	15	06
☽ ☌ ♃ 2°N 48'	18	18	27
♂ Retrograde	18	19	09
☽ Equat N	18	20	13
☽ △ ♇	18	22	54
☽ ✱ ♅	19	6	37
☽ △ ☊	19	17	06
☉ ☌ ☿ Inf.	19	24	43
☽ Perigee	20	5	45
♀ ☌ ♄ 3° S	20	7	35
☽ ☌ ♄ 2°N 46'	20	9	56
☽ ☌ ♀ 8°N 17'	20	10	07
☽ □ ♆	20	12	44
☿ P ♃	20	16	29
☽ ☍ ♂	20	26	24
☉ Vernal Equinox	21	7	16
☽ □ ♅	21	7	30
☉ ∠ ♅	21	14	46
☽ □ ☊	21	17	37
☿ ⚼ ♂	21	18	11
♀ ⚼ ♆	21	18	41
☽ ✱ ☿	21	26	23
☽ ✱ ☉	22	9	22
☽ △ ♆	22	13	56
♀ p ♂	22	19	13
☽ ✱ ♃	22	22	09
☽ 0°.6S *Aldebaran* *Occultation*	22	23	30
Helio ☿ ☍ ♃	*22*	*24*	*00*
☽ ☍ ♇	22	25	01
♀ 80 ♅	22	26	22
☿ 40 ♀	23	8	59
☽ △ ♅	23	9	14
☉ P ☿	23	10	23
☿ 40 ♅	23	17	30
☉ ⚺ ♄	23	17	44
☽ ✱ ☊	23	19	23
☽ □ ☿	23	25	43
☽ ✱ ♄	24	14	28
☽ □ ☉	24	15	48
☽ ✱ ♀	24	23	19
☿ Equat S	24	25	00
☽ M.Dec. 19°N 39'	24	25	51
☽ □ ♃	24	26	09
☉ ✱ ♆	24	28	41
☽ △ ♂	25	6	47
Helio ☿ ☌ ♂	*25*	*17*	*02*
♀ v ☊	25	18	59
☿ ∠ ♀	25	21	01

MARCH—*concld.*

	d	h	m
☽△☿	25	27	17
♃□ Node	25	29	29
♀⚺♃	26	15	51
☽□♄	26	19	57
☽☍♆	26	22	00
☽△☉	26	25	11
☿40♄	26	28	59
♀150♇	27	7	30
☽△♃	27	8	45
☽△♇	27	9	51
☽□♀	27	10	05
☽□♂	27	12	13
♄ p ♇	27	17	30
☉□☊	27	18	07
☽☍♅	27	19	19
☽☌☊	28	6	01
♀☍♂	28	7	19
☉ v ♃	28	25	30
☽△♄	28	27	50
☽□♇	29	17	48
☉ v ☿	29	18	29
☽✶♂	29	19	43
♃△♇	29	19	54
☽△♀	29	23	56
♀ v ♅	30	12	38
☽ V ☉	30	13	38
Helio ☿☍♄	*30*	*13*	*43*
☽☍☿	30	14	36
☿150☊	30	15	30
♂80☊	30	21	30
☽ P ☉	30	26	05
☽△♆	31	15	08
♀□♅	31	17	51
☉□♇	31	19	30
☽ Equat S	31	24	25
☽✶♇	31	27	37
☽☍☉ F. M.	31	28	19
☽☍♃	31	28	46

April

	d	h	m
♂150♃	1	9	12
☉☌♃	1	11	40
☽△♅	1	14	10
☽✶☊	1	24	28
☽ p ☉	1	27	45
Helio ⊕□♀	*2*	*6*	*48*
☿ Direct	2	14	53
☿150☊	2	18	35

APRIL—*contd.*

	d	h	m
☽☍♄	2	25	37
☽□♆	2	26	25
☽☌♂ 3° S 12'	3	15	33
☿ p ♃	3	23	30
☽□♅	3	26	07
☿ Node *S*	4	6	10
☽☍♀	4	10	44
☽□☊	4	11	38
☽△☿	4	12	33
♀160♇	4	15	10
♀□☊	4	18	50
♂⚺♇	4	21	30
♀ p ♆	4	26	13
☽ Apogee	4	27	00
☿✶♀	5	8	07
☽✶♆	5	14	55
☽☌♇	5	27	35
♀40♃	5	28	14
☽△♃	6	7	23
☉✶♅	6	10	33
☉ Q ♆	6	14	11
☽✶♅	6	14	53
☽△☉	6	15	18
♄□♆	6	21	30
☽△☊	6	23	40
☽□☿	6	26	37
☽△♄	7	27	41
☽ M. Dec. 19° S 46'	8	13	19
☽✶♂	8	14	00
☽□♃	8	20	37
♀ v ♆	9	5	50
☽□☉	9	8	21
☽✶☿	9	16	24
☽160♂	9	17	20
☽△♀	9	23	32
☽☌♆ 1° S 08' *Occul.*	10	13	45
☽□♄	10	14	31
☉△☊	10	18	44
☽□♂	10	22	33
☿□♂	10	24	16
☽✶♇	10	25	13
☽✶♃	11	7	06
♀∠♃	11	11	56
☽☌♅ 1° S 02'			
Occultation	11	11	59
♀160♂	11	15	19
☽☍☊	11	19	34
☽✶☉	11	21	32
☿40♄	12	9	17

APRIL—*contd.*

	d	h	m
☽□♀	12	12	26
☽✶♄	12	21	33
♀80☊	12	23	10
☽ v ☉	12	26	11
☽△♂	12	27	24
☽□♇	13	6	58
☽ p ☉	13	9	30
☿ Aphelion	13	26	11
☿40♅	13	27	30
☽☌☿ 1° N 5' *Occul.*	14	10	22
☽✶♀	14	20	09
Helio ♀☍♆	*14*	*22*	*20*
☽✶♆	14	23	09
☽ Equat N	15	6	45
☽△♇	15	8	56
☽☌♃ 3° N 13'	15	15	51
☽✶♅	15	18	39
☽△☊	15	24	32
☽☌☉ N. M.	16	9	52
♀△♆	16	9	57
☿ Gt. Elong 27° W 35'	16	21	40
☽□♆	16	23	20
☽☌♄ 2° N 50'	16	25	09
☽☍♂	16	27	34
☽ P ☉	17	9	54
♀⚺♄	17	10	27
☽ Perigee	17	10	55
☽□♅	17	18	26
☽□☊	17	23	38
♀150♂	18	8	08
☽✶☿	18	17	09
☽△♆	18	23	02
☉ Q ♅	18	25	43
♀ Q ☊	18	27	22
☽☌♀ 6° N 39'	18	28	06
☽ 0°.7 S *Aldebaran*			
Occultation	19	7	30
☽☍♇	19	8	27
☿∠♅	19	9	56
☽✶♃	19	17	06
☽△♅	19	18	34
☽✶☊	19	23	24
♂☍♄	20	7	09
♀ Perihelion	20	11	20
☉ P ♄	20	13	30
♂160♃	20	15	30
☽✶☉	20	16	51
☽□☿	20	22	09
☽△♂	20	26	15

APRIL —*contd.*	*d*	*h*	*m*
☽ M.Dec.19°N52'	21	8	28
♀☍♇	21	10	34
☽□♃	21	20	07
Helio ♀☍♅	*21*	*20*	*50*
☿⚼☊	21	21	24
☿✱♆	21	23	25
☉ p ♂	21	23	44
♀7°N *Aldebaran*	21	25	30
☿150♂	22	13	00
☽□☉	22	24	31
☽☍♆	22	28	19
☽□♂	22	29	06
Helio ⊕□♆	*23*	*5*	*54*
♃ Q ♆	23	7	13
☽△☿	23	7	15
☽□♄	23	7	42
☿⊻♄	23	12	34
☿ Equat N	23	14	04
☽△♇	23	14	45
☽✱♀	23·	19	51
♃✱♅	23	22	07
☽☍♅	23	26	26
☽△♃	23	26	28
☽☌☊	24	7	25
♂□♆	24	8	38
☉ 40♀	24	12	42
☽ V ☉	24	20	10
☉☍♂	24	23	07
☽ P ☉	24	23	30
☽ 0°.5 S *Regulus* *Occltation*	24	26	30
☉□♆	24	28	47
♂ p ♄	25	5	30
☽✱♂	25	10	59
☽△☉	25	12	20
☽△♄	25	15	55
♄ 80♅	25	17	30
☽□♇	25	22	37
☿△♇	26	9	33
☽□♀	26	9	46
♀△♅	26	24	29
♀ 40 ♄	26	27	32
☉ 80 ♅	27	11	24
☉☌♄	27	16	34
♀✱♃	27	17	43
☽△♆	27	21	49
♀□♂	27	28	43
☽ Equat S	28	6	49
☽✱♇	28	8	52

APRIL—*concld.*	*d*	*h*	*m*
☿160♂	28	9	41
☽☍☿	28	15	10
☽△♅	28	21	58
☽☍♃	28	24	07
♀✱☊	28	24	20
☽✱☊	28	26	23
☽△♀	28	26	37
♀⚼♆	29	11	30
Helio ☿☌♆	*29*	*16*	*04*
☉150♇	29	22	18
☽☌♂ 3°S 52'	29	28	59
☽□♆	30	9	27
☽☍♄	30	15	01
Helio ♂☍♄	*30*	*17*	*30*
☿Q♆	30	19	38
☽☍☉ F.M.	30	20	25
☿✱♅	30	23	34

May

	d	*h*	*m*
☽□♅	1	10	05
☽□☊	1	13	24
♂ Closest approach to earth	1	22	58
☿△☊	1	23	50
♀∠♄	1	25	58
☿☌♃ 1°N 44'	1	27	29
Helio ⊕□☿	*2*	*8*	*25*
☽ Apogee	2	11	43
☽ p ☉	2	12	54
☽✱♆	2	21	55
Helio ☿☌♅	*2*	*25*	*40*
☉ V ☊	2	28	58
☽☌♇	3	9	02
☽✱♅	3	22	47
☽△☊	3	24	58
☽△♃	3	27	14
☿□ Node	4	8	40
☽△☿	4	9	30
☉ v ♅	4	11	06
☽☍♀	4	16	06
☿ P ♃	4	18	12
Helio ⊕□♅	*4*	*22*	*20*
☽✱♂	4	26	34
☽△♄	5	17	16
☿ 80♆	5	20	23
☽ M. Dec. 20°S00'	5	20	28
☿⚼♇	5	26	25
☽△☉	6	7	58

MAY—*contd.*	*d*	*h*	*m*
☉ p ♅	6	15	23
☽□♃	6	16	26
♂ 40 ♇	6	19	24
♆ Retrograde	7	6	41
☽□☿	7	6	55
☽□♂	7	12	11
♂ Q ☊	7	19	24
☽☌♆ 0° S 52' *Occultation*	7	21	34
☉□♅	7	22	54
☽□♄	7	28	47
♀△♂	8	6	20
☽✱♇	8	7	53
☿ Q ♅	8	9	23
☽ p ☉	8	9	29
☽ v ☉	8	13	30
☿☍♂	8	15	18
♀ 160 ♇	8	16	05
☉□☊	8	16	16
☽☌♅ 0° S45' *Occultation*	8	21	05
☽☍☊	8	22	29
☽□☉	8	22	58
☽✱♃	8	27	17
☿✱♀	9	10	46
☽△♂	9	19	25
☽△♀	9	23	54
☉ 160 ♂	9	24	31
☽✱☿	9	24	39
☿ p ♇	9	26	11
☿ p ♂	10	8	00
♀⚼♅	10	11	19
☽✱♄	10	12	48
☽□♇	10	15	05
☉160 ♇	10	24	18
♀∠☊	10	25	20
♀ Q ♃	10	26	47
Helio ☿☍♀	*10*	*29*	*12*
☽✱☉	11	9	21
☿□♆	11	12	34
☉⊻♃	11	24	42
♀□ Node	11	28	53
☽□♀	12	8	47
☽✱♆	12	9	40
☽ Equat N	12	17	43
☽△♇	12	18	21
☿ 80 ♅	12	19	18
♀ 150 ♆	12	20	11
☿ P ♄	12	25	07

May —*contd.*

	d	h	m
☽ ✱ ♅	13	6	09
☽ △ ☊	13	6	50
♂ P ♇	13	11	30
☽ ☌ ♃ 3° N36'	13	12	59
☿ ☌ ♄ 0°·S 40'	13	21	07
☽ ☍ ♂	13	23	26
☿ 150 ♇	14	6	43
☽ □ ♆	14	10	20
☽ ✱ ♀	14	13	19
☽ ☌ ♄ 2° N55'	14	17	33
☽ ☌ ☿ 3° N42'	14	20	20
♀ 40 ☊	14	27	17
☽ □ ♅	15	5	55
☽ □ ☊	15	6	02
☽ ☌ ☉ N. M.	15	17	35
♅ ☍ ☊	15	18	35
☽ Perigee	15	20	37
☉ p ♆	15	24	21
☿ v ♅	15	26	51
☿ V ☊	15	27	44
☽ △ ♆	16	9	28
☽ ☍ ♇	16	17	35
☽ 0°.9 S *Aldebaran* *Occultation*	16	18	30
☽ ✱ ☊	16	28	39
☉ v ♆	16	28	40
☽ △ ♅	16	29	02
♀ ✱ ♄	17	6	46
♀ 150 ♇	17	12	40
☽ ✱ ♃	17	13	12
Halio ☿ ☌ ♃	*17*	*13*	*41*
☿ □ ☊	17	17	35
☿ 160 ♂	17	18	34
☽ P ☉	17	19	21
☽ △ ♂	17	20	37
☿ □ ♅	17	21	26
☉ 80 ☊	17	24	20
☉ 150 ♂	17	25	30
☿ p ♅	18	14	14
☽ ✱ ♄	18	17	35
☽ M. Dec. 20° N 05'	18	17	48
☽ ☌ ♀ 5° N 34'	18	19	57
♄ 150 ♇	18	24	42
☿ 160 ♇	18	28	21
☽ ✱ ☿	19	11	15
☽ □ ♃	19	15	08
☽ □ ♂	19	21	28
☽ ✱ ☉	19	25	21

May —*contd.*

	d	h	m
♀ 80 ♃	20	6	26
☽ V ☉	20	6	33
☽ ☍ ♆	20	11	41
☿ ⊻ ♃	20	15	49
☽ △ ♇	20	20	37
☽ □. ♄	20	21	05
♃ Perihelion	20	21	29
☽ ☌ ☊	21	8	41
☽ ☍ ♅	21	9	42
Helio ☿ ☌ ♄	*21*	*14*	*42*
☽ △ ♃	21	20	39
♀ 160 ♆	21	23	36
☿ p ♆	21	25	24
☽ □ ☿	21	25	36
☽ ✱ ♂	21	25	48
☿ 150 ♂	21	26	35
☿ v ♆	21	26	54
♅ Retrograde	21	27	53
☽ 0°.7S *Regulus* *Occultation*	22	8	30
☿ 80 ☊	22	9	24
☽ □ ☉	22	11	04
☽ □ ♇	22	27	16
☽ △ ♄	22	28	26
Helio ☿ ☍ ♂	*23*	*8*	*53*
☽ ✱ ♀	23	16	10
♀ ⊻ ☊	23	18	57
☿ Node N	23	22	15
♀ 150 ♅	24	7	23
☽ △ ☿	24	22	32
☉ P ☿	24	22	47
☽ △ ☉	24	25	15
☽ △ ♆	24	27	23
☉ 40 ♃	25	10	50
☿ ∠ ♀	25	12	48
☽ ✱ ♇	25	13	17
☽ Equat S	25	13	28
☿ 40 ♃	25	19	01
☉ Q ☊	25	23	13
☿ Q ☊	25	23	35
☉ ☌ ☿ Sup.	25	23	51
☿ △ ♆	25	25	41
☽ ✱ ☊	25	26	43
☉ △ ♆	25	27	52
☽ △ ♅	25	28	09
☽ □ ♀	26	8	28
♀ □ ♃	26	9	20
☽ ☍ ♃	26	18	18
☽ ☌ ♂ 5° S0'	26	20	26

May—*concld.*

	d	h	m
♂ 160 ♃	26	20	39
♂ Node S	26	22	41
☽ □ ♆	27	15	09
☿ Perihelion	27	25	49
♀ v ♇	27	25	57
☽ ☍ ♄	27	27	52
☿ V ♀	28	5	52
♀ ∠ ♃	28	7	19
☿ ☍ ♇	28	7	40
☿ ⚼ ♂	28	13	44
☽ □ ☊	28	14	06
☽ □ ♅	28	16	24
☿ ⊻ ♄	28	23	33
☽ △ ♀	28	26	37
☽ △ ♃	29	7	48
☽ Apogee	29	13	45
☉ V ♀	29	15	23
☿ 40 ♀	29	21	30
♀ Q ♄	29	24	42
☽ ✱ ♆	29	27	41
♂ ☍ ♃	30	9	17
☽ ☍ ☉ F.M.	30	12	10
☽ ☌ ♇	30	13	35
Helio ♀ ☍ ♃	*30*	*15*	*31*
☿ ✱ ☊	30	24	56
☽ △ ☊	30	25	40
☽ ☍ ☿	30	25	51
♀ 4°S *Pollux*	30	27	30
☿ P ♀	30	28	10
☽ ✱ ♅	30	28	58
☉ ☍ ♇	31	5	34
♀ ⚼ ♇	31	7	47
☉ ⚼ ♂	31	15	54
☉ ✱ ♃	31	17	16
♀ □ ♂	31	17	19
☿ △ ♅	31	18	59
☽ ✱ ♂	31	20	37

June

	d	h	m
☉ ∠ ♀	1	17	30
☿ ⚼ ♆	1	22	23
☽ M.Dec. 20°S 10'	1	27	15
☽ △ ♄	2	5	54
☉ ⊻ ♄	2	8	52
☽ v ☉	2	20	11
♀ 160 ♅	2	20	59
☿ 40 ♄	2	21	50
☽ □ ♂	3	8	12

June —*contd.*	d	h	m
☽ □ ♃	3	10	08
☽ ☍ ♀	3	14	06
☽ ☌ ♆ 0° S 30'			
Occultation	3	27	13
☿ △ ♂	4	11	00
Helio ☿ ☍ ♆	*4*	*11*	*31*
♂ Direct	4	11	41
☽ ⚹ ♇	4	12	36
☽ □ ♄	4	17	17
☽ △ ☉	4	21	28
☽ ☍ ☊	4	23	35
☿ ⚹ ♃	4	26	40
☽ ☌ ♅ 0° S 31'			
Occultation	4	27	25
☿ ∠ ♄	5	11	52
☽ △ ♂	5	18	03
☽ ⚹ ♃	5	20	49
☽ △ ☿	5	23	52
☉ ⚹ ☊	5	25	13
☉ P ♀	5	27	13
Helio ☿ ☍ ♅	*6*	*12*	*37*
☿ 160 ♇	6	17	00
☽ □ ♇	6	20	57
☽ ⚹ ♄	6	26	03
☿ ∠ ☊	6	26	13
☿ □ Node	7	7	34
☽ □ ☉	7	9	50
♀ 80 ♄	7	23	02
☉ △ ♅	7	26	39
☿ ⚼ ♅	7	26	49
☿ ⚺ ♀	8	10	23
☽ △ ♀	8	14	49
☽ □ ☿	8	15	09
☽ ⚹ ♆	8	17	38
☽ △ ♇	8	25	55
☽ Equat N	8	27	24
☿ 150 ♆	9	9	21
☽ △ ☊	9	11	40
☽ ⚹ ♅	9	15	02
☿ 40 ☊	9	16	34
☽ ⚹ ☉	9	17	46
☽ ☍ ♂	9	28	26
♂ P ♇	10	5	30
☽ ☍ ♆	10	6	19
☽ ☌ ♃ 3° N 55'	10	7	57
☉ ⚼ ♆	10	14	36
☽ □ ♆	10	19	46
☽ □ ♀	10	20	44
♀ 80 ♂	10	22	23

June —*contd.*	d	h	m
☽ ⚹ ☿	10	24	41
☽ ☌ ♄ 3° N 01'	11	8	59
☽ □ ☊	11	12	35
☽ □ ♅	11	16	01
♀ Gt. Elong.			
45° E 23'	11	17	17
☿ 150 ♇	11	24	20
☿ Q ♃	11	28	44
☉ V ☿	12	7	09
☽ △ ♆	12	19	39
☽ ⚹ ♀	12	23	51
☽ ☍ ♇	12	27	10
☽ Perigee	13	6	08
Helio ♀ ☍ ♄	*13*	*6*	*31*
☽ ⚹ ☊	13	11	44
☽ △ ♅	13	15	30
☽ ☌ ☉ N. M.	13	24	33
☿ ⚹ ♄	13	28	13
☽ △ ♂	13	28	52
☉ 40 ♄	13	29	02
☽ ⚹ ♃	14	8	51
Helio ⊕ □ ☿	*14*	*13*	*45*
☽ V ☉	14	23	35
☿ 160 ♆	14	25	52
☿ ⚺ ☊	14	26	44
♀ △ ♇	14	27	51
☽ M. Dec. 20° N12'	14	28	57
☽ ⚹ ♄	15	9	04
☽ ☌ ☿ 4°N 28'	15	12	21
☽ □ ♂	16	5	49
☽ □ ♃	16	10	12
☿ 150 ♅	16	16	29
☽ ☍ ♆	16	20	22
☽ △ ♇	16	28	19
☽ ☌ ♀ 2° N 16'	17	7	48
☉ △ ♂	17	8	00
☽ □ ♄	17	11	33
☽ ☌ ☊	17	13	21
☽ ☍ ♅	17	17	55
☿ 80 ♃	17	18	06
☽ ⚹ ♂	18	10	00
☽ ⚹ ☉	18	11	35
☽ △ ♃	18	14	46
♀ p ♆	18	15	36
☽ 1° S *Regulus*			
Occultation	18	16	30
☽ □ ♇	19	9	26
♃ Q ♅	19	13	30
☽ △ ♄	19	17	46

June —*contd.*	d	h	m
☉ P ☿	19	18	08
♀ □ ♄	19	23	53
☉ ∠ ♄	19	26	41
☿ v ♇	19	27	42
♂ Q ☊	20	5	30
☽ ⚹ ☿	20	10	30
☉ 160 ♇	20	14	03
☉ ⚹ ♃	20	15	56
♀ ☌ ☊	20	23	37
☽ □ ☉	20	23	43
☉ ∠ ☊	20	24	02
♀ Q ♂	20	28	21
☉ ∠ ♀	21	5	30
Helio ☿ ☌ ♃	*21*	*6*	*42*
☽ △ ♆	21	9	10
☿ ⚼ ♇	21	13	30
☽ ⚹ ♇	21	18	22
☽ Equat S	21	21	00
☿ 5° S *Pollux*	21	23	30
☉ Summer Solstice	21	25	19
☽ ⚹ ☊	21	28	55
☽ ⚹ ♀	22	7	15
☽ △ ♅	22	9	46
☿ Q ♄	22	23	45
☽ □ ☿	22	28	08
☽ ☌ ♂ 6°S 10'	23	6	01
☽ ☍ ♃	23	11	08
♃ p ♇	23	11	30
☉ ⚼ ♅	23	12	07
☽ △ ☉	23	15	52
♀ ☍ ♅	23	17	44
☿ 160 ♅	23	18	08
☽ □ ♆	23	20	27
♀ v ♄	23	20	39
☿ □ ♂	23	26	21
☽ ☍ ♄	24	16	12
☽ □ ☊	24	16	36
☽ □ ♅	24	21	45
☽ □ ♀	24	23	57
♄ v ♅	25	5	30
♄ □ ☊	25	16	35
♀ p ♅	25	20	21
☽ Apogee	25	21	00
☉ 40 ☊	25	21	38
☽ △ ☿	25	23	19
☉ 150 ♆	25	23	48
☽ ⚹ ♆	26	8	55
☿ □ ♃	26	14	04
☽ ☌ ♇	26	18	23

JUNE —*concld.*

	d	h	m
☽△☊	26	28	38
☽✱♅	27	10	12
Helio ☿☍♄	*27*	*13*	*46*
☽△♀	27	16	58
☽ v ⊙	27	26	11
☽✱♂	28	9	28
☽△♃	28	13	39
☽☍⊙ F.M.	28	27	07
☿ Gt.Elong.25°E33'	28	28	27
☽ M.Dec. 20°S13'	29	10	09
☽△♄	29	17	36
♂ 40 ♇	29	26	50
☿☍♆	30	14	50
⊙ 150 ♇	30	19	20
☽□♂	30	22	05
☽□♃	30	25	33
☿ Node S	30	29	14

July

	d	h	m
☿ 80 ♄	1	6	37
☿ p ♆	1	7	38
☽✱♂	1	17	36
☽△♃	1	18	21
Helio ♀☌♂	*1*	*28*	*00*
☽□♂	2	8	33
☽□♃	2	9	42
☽☌♆ 0°S 35'	2	11	55
☽☍☿	2	13	06
☽✱♇	2	15	22
☽☍☊	2	18	57
☽□♄	2	19	49
♀160♆	2	20	26
☽☌♅ 0°S 26' *Occultation*	2	21	07
☽☍♀	2	26	44
♀ P ♄	3	8	46
☽△♂	3	8	50
☽✱♃	3	11	25
☽□♇	3	25	25
☽△⊙	4	7	45
☽✱♄	4	12	52
⊙ Q ♃	5	18	43
☽✱♆	5	23	03
⊙⊻☊	5	23	11
⊙160♆	6	5	30
☽△☿	6	6	20
☽△♇	6	7	23
☽ Equat N	6	10	51

JULY —*contd.*

	d	h	m
☽△☊	6	16	07
☽□⊙	6	17	27
☽✱♅	6	20	53
♀ p ♂	6	21	13
⊙ Apogee	6	27	59
☿△♇	7	11	02
⊙✱♄	7	13	21
☿ p ♅	7	13	54
☽△☿	7	15	32
♀ Node S	7	18	13
☽☍♂	7	22	16
☽☌♃ 4°N 06'	7	23	13
☽□♆	7	26	41
☽□☿	8	11	15
⊙ 150 ♅	8	18	55
☽□☊	8	18	56
☽☌♄ 3°N 05'	8	21	44
☽□♅	8	23	26
☽✱⊙	8	23	49
Helio ☿☌♂	*9*	*6*	*52*
☽□♀	9	19	37
♀ V ♃	9	22	57
♀ v ♂	9	24	32
☽△♆	9	28	02
♂☍♃	10	7	06
☽☍♇	10	11	41
☽✱☿	10	13	25
☽ 0°.8 S *Aldebaran Occultation*	10	14	30
☽ V ⊙	10	18	11
☽✱☊	10	19	44
☽△♅	10	24	11
☿ Aphelion	20	25	27
☽ Perigee	11	11	38
☽✱♀	11	22	07
♀ P ♃	11	25	19
☽✱♃	11	26	07
☽△♂	11	26	49
☽ M.Dec.20°N13'	12	15	57
☽✱♄	12	23	39
☿ Retrograde	12	29	02
⊙ 40♀	13	5	30
☽☌⊙ N.M.	13	7	54
♀ 1°.5 S *Regulus*	13	12	30
Helio ⊕□♃	*13*	*14*	*33*
♂ 80 ☊	13	17	01
☽□♃	13	27	38
☽□♂	13	29	18
☽☍♆	13	29	27

JULY —*contd.*

	d	h	m
♂□♆	14	10	18
☽△♇	14	13	29
☽☌☿ 2°S 58'	14	15	40
♀ p ♇	14	17	30
☽☌☊	14	21	45
♀ Gt. Brilliancy	14	24	30
⊙ v ♇	14	25	13
☽□♄	14	25	51
☽☍♅	14	26	26
⊙ 80 ♃	15	12	42
Helio ☿☌♀	*15*	*16*	*41*
☽ 1°.1S *Regulus Occultation*	15	26	30
⊙□♇	15	29	06
☽☌♀ 3°S 10'	16	6	08
☽△♃	16	7	33
☽✱♂	16	10	30
☽□♇	16	17	30
♂ p ♄	16	26	50
☽△♄	17	7	01
☿ p ♂	17	8	30
☿ P ♄	17	14	30
☽✱⊙	17	23	58
♄□♅	18	9	30
☽△♆	18	15	56
♀△♃	18	19	00
⊙ 160 ♅	18	21	30
☽✱♇	18	25	04
☽✱☿	18	25	22
☽ Equat S	18	29	27
☿△♇	19	9	47
☽✱☊	19	10	51
☽△♅	19	15	41
♀150♆	19	20	07
☽□⊙	20	14	30
☽☍♃	20	26	02
☽□♆	20	26	14
☽✱♀	20	27	11
⊙ Q ♄	20	29	03
☽☌♂ 7°S 02'	21	8	23
☽□☿	21	9	50
♃□♆	21	20	30
☽□☊	21	22	08
☿□♂	21	25	38
☽□♅	21	27	00
☽☍♄	21	27	47
☿ 80♂	22	24	29
☽△⊙	23	7	58
☽ v ⊙	23	8	36

July —*concld.*	d	h	m
☽ Apogee	23	11	14
☽✱♆	23	14	28
☽□♀	23	17	02
☽△☿	23	19	12
☽☌♇	23	24	19
☽△☊	24	10	32
☽✱♅	24	15	20
☿⊻♀	24	23	17
♂⊻♇	24	26	04
☽ p ☉	25	19	04
☽△♃	25	27	39
☽△♀	26	6	12
☿□♃	26	10	24
☽✱♂	26	13	40
☉☍♆	26	15	02
☽ M.Dec.20°S12'	26	17	33
Helio ☿☌♆	*26*	*19*	*18*
☉☌☿ Inf.	26	21	19
☽△♄	26	28	35
☿☍♆	27	6	06
☉□♃	27	7	36
☉ p ♆	27	19	54
☽ p ☉	27	28	57
☽☍☿	28	11	25
☽☌♆ 0°S 39' *Occultation*	28	12	58
☽□♃	28	14	33
☽☍☉ F. M. *Partial Lunar Eclipse*	28	16	55
☉⊻♀	28	20	10
☽✱♇	28	22	24
☽☍☊	29	8	03
☽☌♅ 0°S 31' *Occultation*	29	12	18
☽□♄	29	14	23
☉ 80 ♄	29	27	43
♀ Retrograde	30	7	09
Helio ☿☌♅	*30*	*7*	*34*
☽✱♃	30	23	11
☽☍♀	30	25	21
☽□♇	31	6	21
☿□ Node	31	7	54
☽△♂	31	12	04
☉△♇	31	17	05
☽✱♄	31	21	55
August			
☽△☿	1	21	32
☽✱♆	1	27	13

August —*contd.*	d	h	m
☽△♇	2	12	03
☽△☉	2	15	22
☽ Equat N	2	16	35
☽△☊	2	21	04
♂ P ♅	2	21	30
☽✱♅	2	24	41
Helio ⊕□♄	*3*	*6*	*22*
♂ 80 ♆	3	23	30
☽□☿	3	24	42
☽□♆	4	7	20
♂□☊	4	8	36
☽☌♃ 4°N 06'	4	9	58
☽△♀	4	10	30
☉ p ♂	4	15	39
☽□☉	4	22	57
☽□☊	4	24	44
☽☍♂	4	25	19
☽□♅	4	28	05
☽☌♄ 3°N 02'	5	6	58
☽ V ☉	5	8	47
♀ Q ♄	5	9	30
Helio ♀☌♆	*5*	*13*	*10*
♀△♃	5	14	21
☉ p ♅	5	15	23
☉ p ☿	5	22	32
☉☌☊	5	25	22
☽✱☿	5	27	04
☿ p ♅	6	7	21
☿ Direct	6	8	49
☽△♆	6	9	56
☉ V ♄	6	10	23
☽□♀	6	12	17
☽ p ☉	6	18	20
☽☍♇	6	18	26
☽ 0°.8 S *Aldebaran Occultation*	6	21	30
☽✱☊	6	27	03
☽✱☉	6	28	53
☽△♅	7	6	13
♂□♅	7	22	26
☉☍♅	7	24	08
☿ Q ♄	7	25	30
☉□♂	7	26	27
☽ Perigee	7	29	05
☉ v ♂	7	29	14
☽✱♀	8	13	07
☽✱♃	8	14	54
♂ V ♅	8	16	45
♀ Q ♂	8	21	13

August —*contd.*	d	h	m
☽ M. Dec. 20°N 11'	8	24	59
☽△♂	9	9	19
☽✱♄	9	11	20
☉□♄	9	26	21
☽☌☿ 1°S 09' *Occultation*	10	8	40
☽☍♆	10	13	49
☽□♃	10	17	18
♀ 150 ♆	10	18	30
♀ Aphelion	10	21	10
♀ 8° S *Regulus*	10	21	30
☽△♇	10	22	34
☽☌☊	11	7	24
☽☍♅	11	10	22
☽□♂	11	14	00
☽□♄	11	14	09
♃ 80 ♅	11	15	06
☽☌☉ N. M. Total Solar Eclipse	11	16	38
♂☍♄	11	17	53
☽ P ☉	11	19	47
♂ v ☊	11	24	25
☽☌♀ 8°S 59'	12	15	49
☽△♃	12	21	14
Helio ♀☌♅	*12*	*24*	*42*
☽□♇	12	26	34
☿⊻♀	13	8	46
☽△♄	13	19	04
☽✱♂	13	21	05
☉ P ♄	13	26	58
☿☍♆	14	16	27
☿ Gt. Elong. 18°W 48'	14	19	42
☽△♆	14	23	32
☽✱☿	14	24	06
Helio ☿☌♃	*14*	*26*	*02*
☽✱♇	15	9	24
☽ Equat S	15	13	36
☽✱☊	15	19	14
☽△♅	15	22	15
☉ 160 ♆	15	22	35
♀ 80 ♂	16	13	44
☽✱☉	16	14	40
☿□♃	16	23	25
☽✱♀	16	26	43
♂ P ♆	16	26	50
☽□♆	17	8	55
☽☍♃	17	13	50
☽□☿	17	15	23
☽ v ☉	17	15	51

AUGUST —*contd.*

	d	h	m
♂ Q ♆	17	24	10
Helio ☿☌♄	*17*	*27*	*01*
☽□☊	18	5	41
☽□♅	18	8	42
☽☍♄	18	14	02
☉ V ♃	18	16	42
☿ 80 ♄	18	17	21
☽☌♂ 7°S 14'	18	21	42
☽ p ☉	18	23	07
☿△♇	19	5	30
♇ Direct	19	7	12
☽□☉	19	7	17
☽□♀	19	11	37
☿ v ♂	19	19	35
☽✱♆	19	20	46
☿ Node N	19	21	33
☽ Apogee	19	28	56
☽☌♇	20	7	39
☽△☿	20	11	17
☉☌♀ Inf.	20	17	28
☽△☊	20	18	02
Helio ⊕□☿	*20*	*19*	*58*
☽✱♅	20	20	56
♄ V ☊	21	5	30
☽△♀	21	21	06
☽△☉	21	25	06
☽△♃	22	14	22
☿ V ♄	22	14	37
☿☌☊	22	15	03
☉ P ♃	22	16	18
☽ M.Dec. 20°S 12'	22	25	27
☿☍♅	23	9	51
☽△♄	23	14	21
☿ p ♅	23	15	47
☿ Perihelion	23	25	07
☽✱♂	23	27	41
♂ 80 ♅	24	11	49
☽☌♆ 0°S 43' *Occultation*	24	19	30
♀□♂	24	22	50
☽□♃	24	24	47
☿□♄	24	26	20
☽✱♇	25	6	04
♃ Retrograde	25	8	05
☽☍☊	25	15	53
☽☌♅ 0°S 37' *Occultation*	25	18	00
♂ 160 ♃	25	20	10
☽□♄	25	23	40

AUGUST —*concld.*

	d	h	m
☉ 150 ♆	25	25	54
☽☍☿	25	27	10
☽☍♀	26	11	31
☽□♂	26	14	58
☉ p ♇	26	26	03
☽☍☉ F.M.	26	29	18
☽✱♃	27	8	20
☽□♇	27	13	17
☽ p ☉	27	16	16
Helio ☿☍♂	*27*	*17*	*30*
☿ 160 ♇	27	19	29
☉ 160 ♅	27	23	54
☿☌♀ 10°S 10'	27	26	12
☽✱♄	28	6	09
☉△♃	28	22	53
☽△♂	28	23	09
♀ 160 ♇	28	28	40
☿ V ♃	29	7	35
☽✱♆	29	8	19
☿ P ♄	29	9	30
☽△♇	29	18	05
☽ Equat N	29	22	27
☽△☊	29	26	50
☽✱♅	29	28	47
♄ Retrograde	30	6	59
♂ V ♆	30	16	10
☽△♀	30	17	32
☿□♂	30	20	30
☽ V ☉	30	20	34
☽△☿	31	6	09
☽□♆	31	11	42
Helio ☿☍♆	*31*	*13*	*00*
☽☌♃ 3°N 57'	31	16	31
☉□♇	31	20	49
☽△☉	31	21	25

September

	d	h	m
☽□☊	1	5	43
☽□♅	1	7	42
☽☌♄ 2°N 51'	1	13	16
☽□♀	1	19	00
☿ 150 ♆	1	21	50
♀□Node	1	26	31
☽☍♂	2	10	16
☽△♆	2	14	21
Helio ☿☍♅	2	*16*	*10*
☽□☿	2	17	02
☿ P ♃	2	18	58

SEPTEMBER —*contd.*

	d	h	m
☿ 160 ♅	2	19	42
☽ Perigee	2	23	33
☽☍♇	2	24	04
☽ 0°.8 S *Aldebaran* *Occultation*	2	27	30
☽□☉	2	27	47
☿□Node	3	6	52
☿△♃	3	8	07
☽✱☊	3	8	21
☉ 80 ♂	3	9	06
☽△♅	3	10	15
☽✱♀	3	20	31
☉ P ♀	3	28	46
☿ p ♇	4	16	10
☿□♇	4	20	28
☽✱♃	4	21	50
☽✱☿	4	27	59
☽ M.Dec. 20°N 14'	5	7	35
☽✱☉	5	10	26
☽✱♄	5	18	54
♂ Q ♅	5	19	18
☉⊻☊	5	23	36
♂✱♆	5	28	16
☽☍♆	6	20	23
☽△♂	6	21	12
☉ 150 ♅	6	23	12
☽□♃	6	25	10
☽△♇	7	6	33
☿ 80 ♂	7	9	36
☿⊻☊	7	9	40
☽☌☊	7	15	06
☽☍♅	7	16	45
☿ P ♀	7	18	21
☿ 150 ♅	7	21	05
☽□♄	7	22	46
☽☌♀ 8°S 06'	7	26	00
☽ 1°.1S *Regulus* *Occultation*	8	20	30
☉☌☿ Sup.	8	20	31
☽□♂	8	28	23
☽△♃	9	5	41
☽□♇	9	11	30
☿□♆	9	14	08
☿△♄	9	16	27
☿ 80 ♇	9	26	19
☽☌☉ N. M.	9	27	32
☽△♄	9	28	06
♂ 150 ♃	10	5	30
☽☌☿ 1°S29'	10	6	03

SEPTEMBER —*contd.*	d	h	m
☉⚼♆	10	6	19
☉△♄	10	10	47
☿⚺♀	10	14	21
☽P☉	10	19	44
☿⚼♃	10	23	39
♀ Direct	11	5	57
☽△♆	11	7	15
☽✶♂	11	13	55
☽✶♇	11	18	31
☽ Equat S	11	22	45
☽ v ☉	11	25	03
☽✶☊	11	27	09
☽△♅	11	29	04
☉⚺♀	12	5	30
☿ 40 ☊	12	13	34
☉P☿	12	14	30
☽✶♀	12	15	12
☉⚼♃	12	20	36
☽P☉	12	21	57
Helio ☿☍♀	*13*	*12*	*00*
☽□♆	13	16	16
☽☍♃	13	21	10
☿Q♂	13	22	59
♂160♄	13	23	04
☿Q♇	14	11	33
☽⊡☊	14	12	39
☽□♅	14	15	04
☽☍♄	14	22	01
☽□♀	14	26	12
☿∠☊	14	28	26
☽✶☉	15	7	39
♂☌♇	15	9	48
☉ 40 ☊	15	16	20
☽✶☿	15	20	55
☿⚼♅	15	20	55
☽✶♆	15	27	41
☿40♀	16	8	36
☽☌♇	16	16	09
☽☌♂ 6°S 34'	16	17	54
☽ Apogee	16	24	10
☽△☊	16	24	32
☽✶♅	16	27	07
♂ 3°N *Antares*	17	12	30
☽△♀	17	15	37
☿△♆	17	18	45
☿⚼♄	17	20	13
☿ Equat S	17	24	54
☽□☉	17	25	36
☽□☿	18	19	56

SEPTEMBER —*contd.*	d	h	m
☽△♃	18	20	45
☿150♃	18	25	19
☉ v ☿	19	6	24
☽ M.Dec. 20°S19'	19	9	37
☉Q♇	19	15	01
Helio ☿☍♃	*19*	*16*	*53*
☿∠♀	19	17	13
☉P☿	19	22	12
☽△♄	19	22	17
☉∠☊	20	18	20
☽△☉	20	18	34
☽☌♆ 0°S 40' *Occultation*	20	27	28
☽□♃	21	7	25
☿✶♇	21	10	35
☽✶♇	21	15	29
☽△☿	21	16	13
♂△☊	21	16	54
☉⚼♅	21	22	18
☽☍☊	21	23	20
☽✶♂	21	23	37
☽☌♅ 0°S 37' *Occultation*	21	25	24
☽□♄	22	7	53
☽☍♀	22	16	03
♂✶♅	23	7	47
☽✶♃	23	14	45
☉ Autumnal Equinox	23	17	01
☿✶☊	23	21	16
☽□♇	23	22	48
♀160♆	23	24	53
☽□♂	24	9	12
☿△♅	24	13	45
☽✶♄	24	13	52
Helio ☿☍♄	*24*	*14*	*24*
☿160♃	24	17	51
☉⚼♄	25	7	52
☽ V ☉	25	10	09
☉△♆	25	10	23
☿✶♂	25	11	56
☽✶♆	25	15	52
☽☍☉ F.M.	25	16	21
☽P☉	25	25	41
☽△♇	25	26	50
☽ Equat N	26	5	34
☿ 150♄	26	15	18
☉ 40 ♀	26	17	55
☽✶♃	26	18	16
♀ Gt. Brilliancy	26	20	30

SEPTEMBER —*concld.*	d	h	m
☉150♃	26	25	04
☿ Node S	26	28	38
☽△☊	27	14	59
☽✶♅	27	15	47
☽△♂	27	17	27
☽□♆	27	18	05
Helio ♀☌♃	*27*	*18*	*25*
☽☍☿	27	18	35
☽☌♃ 3°N 43'	27	20	35
☽△♀	27	21	25
♂150 ♄	27	25	41
♂∠♆	28	8	56
♃ 80 ♅	28	10	18
☽□☊	28	10	24
☽□♅	28	12	59
☉Q♂	28	16	48
☽☌♄ 2°N 37'	28	18	26
☽ Perigee	28	22	12
☽□♀	29	7	31
☽△♆	29	19	36
☽△☉	29	27	17
♂⚼♃	29	29	00
☽☍♇	30	6	29
☽ 1°S *Aldebaran Occultation*	30	9	30
☽✶☊	30	11	43
☽△♅	30	14	36
☿ 1°.7 N *Spica*	30	21	30
☿∠♇	30	22	18
☽☍♂	30	23	37
☿Q☊	30	23	41
☿p♀	30	27	16

October

	d	h	m
☽△☿	1	8	44
☽✶♀	1	11	40
☽✶♃	1	23	42
☉✶♇	1	27	01
☽□☉	2	9	32
☽ M.Dec. 20°N 25'	2	12	43
☿ P♇	2	17	11
☿ 160 ♄	2	21	30
☽✶♄	2	22	47
☿ p ♃	2	26	00
☿✶♀	3	5	59
☽□☿	3	18	26
☽☍♆	3	25	34
☽□♃	3	27	06
☿ 40 ♇	4	7	09

October—*contd.*

	d	h	m
♀ v ♃	4	10	35
☽ △ ♇	4	13	24
☽ ✶ ☉	4	17	49
☽ ☌ ☊	4	18	41
Helio ♂ ☌ ♆	*4*	*19*	*46*
☽ ☍ ♅	4	21	42
☽ □ ♄	4	27	11
☉ ✶ ☊	5	5	30
♂ 40 ♆	5	11	47
☽ △ ♂	5	13	08
☽ ☌ ♀ 4°S 32'	5	25	44
☽ 1°.2 S *Regulus*			
Occultation	5	27	30
☉ 160 ♃	5	28	25
☽ ✶ ☿	6	6	19
☿ v ♀	6	6	25
☿ 80 ☊	6	7	52
☽ △ ♃	6	8	13
☿ □ ♆	6	13	13
☽ □ ♇	6	19	25
☉ △ ♅	6	21	54
☿ ☍ ♃	6	22	21
☿ Aphelion	6	24	45
Helio ♀ ☌ ♄	*6*	*28*	*29*
☽ △ ♄	7	9	18
☽ v ☉	7	10	22
♃ p ♇	7	13	30
☽ □ ♂	7	22	59
☽ p ☉	7	24	06
♀ p ♄	7	27	34
☽ △ ♆	8	14	23
☽ ✶ ♇	8	27	14
♀ 3°S *Regulus*	8	27	30
☽ Equat S	9	6	20
☽ ✶ ☊	9	7	57
☽ △ ♅	9	11	49
☽ ☌ ☉ N.M.	9	17	04
☉ 150 ♄	9	18	50
♀ 150 ♆	9	24	48
♀ △ ♃	10	5	57
☽ ✶ ♂	10	11	05
☽ P ☉	10	19	26
☽ □ ♆	10	23	39
☽ ☍ ♃	10	23	47
☽ ✶ ♀	10	25	10
♂ ⚻ ☊	10	26	27
☿ ⊻ ♇	11	10	18
♃ □ ♆	11	12	21
☽ ☌ ☿ 7°S 09'	11	13	27
☽ □ ☊	11	16	58

October—*contd.*

	d	h	m
♀ 160 ♅	11	17	45
☽ □ ♅	11	21	50
☽ ☍ ♄	11	27	13
☉ ∠ ♀	12	16	25
☿ □ ☊	12	17	14
☽ ✶ ♆	13	11	01
☽ □ ♀	13	16	54
☿ 80 ♆	13	17	12
☽ ☌ ♇	13	25	05
☽ △ ☊	13	28	00
♆ Direct	14	7	12
♂ ∠ ♅	14	8	51
☽ ✶ ♅	14	9	50
☿ P ♅	14	12	07
☉ p ♀	14	15	41
☿ □ ♅	14	17	03
☽ Apogee	14	19	19
☽ ✶ ☉	14	26	24
☿ ∠ ♂	14	26	50
☽ ☌ ♂ 5°S 06'	15	18	20
☉ Q ☊	15	21	53
☽ △ ♃	15	22	36
☽ △ ♀	16	10	19
☿ ☍ ♄	16	14	30
☽ M.Dec.20°S 33'	16	17	41
☉ v ♀	16	21	04
☽ △ ♄	16	27	30
☽ ✶ ☿	16	29	07
♂ ⚻ ♄	17	16	00
☉ ∠ ♇	17	17	30
☽ □ ☉	17	20	30
☿ V ♅	17	24	38
♂ △ ♃	18	6	26
☽ □ ♃	18	10	04
☽ ☌ ♆ 0°S 28'			
Occultation	18	11	51
♀ □ ♇	18	14	55
☿ P ♆	18	17	01
☽ ✶ ♇	18	25	47
☽ ☍ ☊	18	27	56
☉ 160 ♄	19	5	30
☽ ☌ ♅ 0°S 26'			
Occultation	19	9	46
♂ ⊻ ♆	19	12	12
☽ □ ♄	19	14	04
♀ ⊻ ☊	19	20	37
☽ □ ☿	19	22	15
☿ Q ♆	19	25	30
☉ p ♃	20	10	30
☽ △ ☉	20	11	23

October—*contd.*

	d	h	m
☿ v ☊	20	14	19
☿ 160 ♃	20	17	30
☽ ✶ ♃	20	18	37
Helio ⊕ □ ☿	*20*	*18*	*55*
☽ ✶ ♂	20	22	50
☽ v ☉	20	23	39
♂ 40 ♅	21	6	03
☽ P ☉	21	9	54
☽ □ ♇	21	9	58
☽ ☍ ♀	21	14	36
☽ ✶ ♄	21	20	57
☽ △ ☿	22	9	50
☉ P ♇	22	11	13
☉ 40 ♇	22	22	21
Helio ☿ ☌ ♆	22	22	25
☿ 80 ♅	22	22	35
☽ ✶ ♆	22	25	53
♀ 150 ♅	22	29	04
☽ □ ♂	23	6	33
♅ Direct	23	11	53
☉ 80 ☊	23	14	04
☽ △ ♇	23	14	05
☽ △ ☊	23	15	07
☽ Equat N	23	16	22
☽ ✶ ♅	23	20	46
☉ ☍ ♃	23	24	34
Helio ♂ ☌ ♅	*24*	*11*	*20*
☽ ☌ ♃ 3°N 37'	24	24	34
☽ ☍ ☉ F.M.	24	26	32
☿ Gt.Elong.24°E17'	24	27	21
☽ □ ♆	24	27	31
♀ △ ♄	24	27	56
♀ ⚻ ♃	25	5	30
☽ △ ♂	25	10	27
☽ □ ☊	25	15	35
☉ □ ♆	25	17	31
☽ □ ♅	25	21	36
☽ ☌ ♄ 2°N 29'	25	24	28
☽ △ ♀	25	25	59
☽ p ☉	25	28	39
♇ △ ☊	26	11	30
Helio ☿ ☌ ♅	*26*	*13*	*30*
☽ Perigee	26	18	27
☽ ☍ ☿	26	19	51
Helio ♀ ☌ ♂	*26*	*24*	*07*
☽ △ ♆	26	27	41
♀ ⚻ ♆	26	28	14
☿ □ Node	27	7	10
☽ ✶ ☊	27	15	10

OCTOBER —*concld.*

	d	h	m
Helio ⊕□♆	*27*	*15*	*30*
☽☍♇	27	15	31
☽ 1°.2S *Aldebaran*			
Occultation	27	17	30
☽△♅	27	21	46
☽□♀	27	29	28
☿40♂	28	5	30
☿ V ♆	28	17	30
♀ Node N	28	21	43
☽✱♃	28	24	27
♂150☊	28	26	08
♀ 40☊	28	28	23
☽△☉	29	10	27
♀ 80♇	29	15	36
☽☍♂	29	16	43
♂⊻♇	29	16	56
☿ 150♃	29	18	41
☽M.Dec. 20°N 39'	29	19	09
☽✱♄	29	25	32
☿ 40♂	30	9	30
☽✱♀	30	10	55
☉p♄	30	10	57
♂□Node	30	14	49
☽□♃	30	26	32
☽△☿	30	28	25
♀Gt. Elong. 46°W 29'	30	29	15
☽☍♆	31	7	12
☽□☉	31	17	34
☽☌☊	31	19	12
☽△♇	31	20	17
☽☍♅	31	26	54
☽□♄	31	29	06

November

	d	h	m
☉□☊	1	15	20
☽v☉	1	18	03
☿Q♅	1	19	21
☽p☉	1	24	37
☉⊻♇	2	7	09
☽△♃	2	7	14
☽□☿	2	11	48
♀∠☊	2	25	41
☽□♇	2	26	32
☽✱☉	2	28	05
☽△♂	3	8	38
☽△♄	3	11	21
♂⊻♅	3	21	52
☽☌♀ 3°S 10'	4	7	33

NOVEMBER —*contd.*

	d	h	m
☉80♆	4	19	54
☽✱☿	4	20	42
☽△♆	4	20	44
♂△♄	4	27	32
☿✱♆	5	5	30
♀ Retrograde	5	8	12
☽✱☊	5	9	10
☽✱♇	5	11	11
☽Equat S	5	13	05
☽△♅	5	18	12
☽□♂	5	20	59
☉□♅	5	25	13
♀Q♇	6	19	06
☉☍♄	6	19	23
☽☍♃	6	23	32
☽□♆	7	6	41
♀⚼♅	7	9	22
♀150♃	7	10	55
☽□☊	7	18	28
♀⚼♄	7	24	08
☿∠♂	7	28	46
☽□♅	7	28	47
☽☍♄	8	6	00
☽☌☉N.M.	8	9	23
☽✱♂	8	11	28
☿ Q♅	8	11	30
Helio ⊕□♅	*8*	*22*	*11*
☿✱♀	9	14	47
☽☌☿6°S 35'	9	15	22
☽✱♀	9	15	28
♂160☊	9	17	30
☽✱♆	9	18	21
☉ V ♅	9	26	21
☽ P ☉	9	26	36
☽△☊	9	29	10
☽☌♇	10	9	50
☽✱♅	10	17	00
☉ 160♃	10	17	09
♀△♆	10	24	33
☽Apógee	11	11	00
☽△♃	11	22	23
♀ Equat S	11	25	08
☉✱♂	12	5	30
☉P♅	12	8	30
☽□♀	12	10	14
Helio ☿☌♃	*12*	*12*	*30*
♂40♇	12	18	20
☿150♃	12	18	53
☉Q♆	12	21	46

NOVEMBER —*contd.*

	d	h	m
☽ M.Dec. 20°S 48'	12	25	17
☽△♄	13	6	18
☽☌♂ 3°S 0'	13	20	55
♂V♇	13	21	30
☽✱☉	13	21	49
☽✱☿	14	7	18
☿ P ♆	14	7	21
☽□♃	14	10	37
♄□♅	14	15	06
Helio ☿☌♄	*14*	*15*	*08*
☽☌♆ 0°S 11'			
Occultation	14	19	57
☽△♀	14	28	50
☽☍☊	15	5	37
☽ V ☉	15	7	40
☽ P ☉	15	8	03
☽✱♇	15	11	25
♀✱☊	15	13	37
☽□♄	15	17	57
☽☌♅ 0°S 07'			
Occultation	15	18	09
☿ Node N	15	20	42
☉ P ☿	15	20	46
♀160♃	15	20	50
☿ 80 ♅	15	27	27
☉☌☿ Inf.	15	27	34
☉ 80 ♅	15	27	52
☉ v ☊	16	8	15
☿∠♀	16	10	58
☽□☿	16	12	38
☽□☉	16	14	33
☿✱♂	16	14	54
☽✱♃	16	20	56
☿ P ♅	17	6	50
☽□♇	17	20	58
☽✱♄	17	26	39
♀✱♇	18	8	30
☿ 40♀	18	13	23
☿ Q ♆	18	14	30
☽△☿	18	15	26
☽✱♂	18	23	14
☽△☉	18	26	34
☽✱♆	19	12	46
☉ 150♃	19	16	03
♂∠♇	19	17	13
☽△☊	19	20	43
☉ P ♆	19	24	21
☿ Perihelion	19	24	23
☽△♇	19	26	21

NOVEMBER —*contd.*

	d	h	m
☽ Equat N	19	27	41
☽☍♀	20	5	50
☽✱♅	20	8	04
♀ 150 ♄	20	21	23
☉ V ♆	20	24	51
☽△♂	20	29	19
☽☌♃ 3° N 44'	21	6	12
♀△♅	21	11	02
☽□♆	21	15	07
♂□♃	21	20	05
☽□☊	21	22	00
☽☌♄ 2° N 33'	22	8	00
☽□♅	22	9	12
☽☍☿	22	14	11
☿ 160 ♃	22	15	39
☽△♂	23	7	54
☽☍☉ F. M.	23	12	34
☽△♆	23	14	55
☉∠♀	23	15	47
☿ Q ♂	23	18	15
☿ ⊻ ♀	23	20	01
☽✱☊	23	21	01
☽ Perigee	23	27	24
☽☍♇	23	27	24
☽ 1°.3S *Aldebaran*			
Occultation	23	27	30
☉ Q ♅	24	6	43
☽△♅	24	8	36
☉ V♂	24	12	18
☽△♀	24	14	01
☉✱♆	24	25	02
☽✱♃	24	28	51
☉ 160 ♄	25	5	30
☿ Direct	25	9	37
♀ Q ☊	25	11	25
♂ Perihelion	25	18	58
☽ M.Dec. 20°N 52'	25	28	31
☽✱♄	26	6	32
☽ p ☉	26	7	08
Helio ♀☍♆	26	*11*	*08*
☽△☿	26	12	22
☽□♀	26	17	58
☽ v ☉	26	28	45
☽□♃	26	29	06
☿ 160 ♃	27	8	04
☽☍♂	27	13	13
Helio ☿☍♆	27	*14*	*27*
☽☍♆	27	15	28
☽△☉	27	20	02

NOVEMBER —*concld.*

	d	h	m
☽☌☊	27	21	17
Helio ☿☌♀	27	*25*	*58*
☽△♇	27	28	58
☽□♄	28	8	14
☽☍♅	28	10	38
☉ P ♂	28	12	21
☉△☊	28	13	06
☽□☿	28	16	04
☽✱♀	28	25	10
♀ 160 ♄	28	29	10
♂☌♆ 1°N 44'	29	8	14
☽△♃	29	8	16
♀ 4°N *Spica*	29	9	30
Helio ☿☍♅	29	*19*	*42*
☽□☉	29	28	48
☿□ Node	30	6	07
☽□♇	30	10	14
☽△♄	30	13	15
☽✱☿	30	24	44

December

	d	h	m
♀ Perihelion	1	10	06
♀∠♇	1	26	38
☽△♆	1	27	16
☽△♂	2	7	27
♀ 80 ☊	2	8	06
♀☍♃	2	9	07
☽✱☊	2	9	36
☽✱☉	2	17	50
☽✱♇	2	18	46
☽ Equat S	2	19	36
☽△♅	2	24	58
♃ Q ♅	2	25	30
☉☌♇	2	29	07
☿ Gt.Elong. 20°W 23'	3	6	47
☿ Q ♆	3	9	02
☉⚼♃	3	9	38
♂☌☊	3	14	33
♂ 80 ♃	3	17	15
☽☍♃	3	24	17
Helio ♀☍♅	*3*	*26*	*00*
♀ p ♃	3	27	35
☽☌♀ 3°S 0'	3	28	33
☉ 150 ♄	4	11	24
Helio ⊕□♂	*4*	*11*	*46*
☽□♆	4	13	40
☽□☊	4	19	31
☽□♂	4	21	51
Helio ☿☍♂	*4*	*24*	*41*

DECEMBER —*contd.*

	d	h	m
Helio ⊕□☿	*4*	*26*	*03*
☽☍♄	5	8	01
♃□♇	5	9	30
☽□♅	5	12	09
☿ V ♂	5	18	39
☽☌☿ 2°S 50'	6	7	59
☿ 80 ♅	6	10	14
☉✱♅	6	12	01
♀ 40 ♇	6	13	58
☽✱♆	6	25	44
☽△☊	7	6	44
☽✱♂	7	14	08
☿ 150 ♃	7	18	07
☽☌♇	7	18	13
♂ P ♆	7	22	57
☽✱♅	7	24	42
☿ P ♅	7	26	37
☽☌☉ N.M.	7	28	02
♀□♆	8	5	30
☽ Apogee	8	16	33
☽△♃	8	24	06
♀ P ♇	8	25	19
☽✱♀	9	18	14
♀□☊	9	24	27
☉∠♆	10	5	30
☿ Q ♂	10	6	11
♂✱♇	10	8	14
☽ M.Dec. 20°S 56	10	8	23
☽△♄	10	8	36
☽ V ☉	10	10	44
♂□♄	10	27	03
☿ P ♂	11	6	48
☽□♃	11	12	44
☽✱☿	11	24	25
☉⚼☊	11	27	11
☽☌♆ 0°N 04'			
Occultation	11	27	31
☿ 160 ♄	11	27	50
☽☍☊	12	7	17
☽□♀	12	13	25
☿ Q ♅	12	16	37
☽✱♇	12	19	53
☽□♄	12	20	42
☽☌♂ 0°S 34'			
Occultation	12	23	49
☿ P ♆	12	25	40
☽☌♅ 0°N 12'	12	26	16
☿✱♆	12	27	45
♂ Q ♃	13	13	00

DECEMBER —*contd.*	*d*	*h*	*m*
☽✱☉	13	16	12
☽✱♃	13	24	13
☿△☊	14	11	43
♂☌♅ 0°N 39'	14	16	25
☽□☿	14	19	08
♀p♄	14	26	22
☽△♀	15	6	11
☽□♇	15	6	28
☽✱♄	15	6	50
☉ 40 ♆	15	7	06
♀⊻♇	15	9	20
♀☍♄	15	12	58
☽□☉	16	6	20
☽✱♆	16	22	44
♀80♆	16	22	53
☽△☊	16	25	58
♂P♅	17	7	21
☽△☿	17	9	25
☽△♇	17	13	20
☿ 5°N Antares	17	13	30
☽ Equat N	17	13	48
♄ 150 ♇	17	15	06
☉△♃	17	15	57
♀V♂	17	18	31
☽✱♅	17	18	59
☽✱♂	17	23	10
♀□♅	17	28	27
☿⚼♃	18	7	56
☉⚼♄	18	11	30
☽☌♃ 4°N 02'	18	13	50
☽△☉	18	15	33
☿ 150 ♄	18	21	09
♀ 160 ♃	18	22	30
☿☌♇	18	22	53
☽□♆	18	29	24
☽□☊	19	5	30
Helio ☿☍♃	*19*	*6*	*02*

DECEMBER —*contd.*	*d*	*h*	*m*
♀V♅	19	11	20
☽☌♄ 2°N 48'	19	16	10
☽□♅	19	21	40
☽☍♀	19	25	10
☽□♂	19	28	16
♃ Direct	20	20	20
☽△♆	20	27	35
☿✱♅	20	28	24
☽✱☊	21	5	46
♂v♄	21	12	35
☽☍♇	21	16	36
☉∠♅	21	20	24
☽△♅	21	21	43
☽☍☿	21	23	32
☽△♂	22	6	28
☉ W. Solstice	22	13	14
☽✱♃	22	14	33
Helio ☿☍♄	22	*15*	*31*
☽ Perigee	22	16	24
♀□ Node	22	21	39
☽☍☉ F.M.	22	23	01
☽v☉	22	23	48
♂ 80 ♄	23	7	28
♀P♂	23	12	10
☿∠♆	23	14	08
☽✱♄	23	15	10
☽ M.Dec. 20°N 57'	23	16	19
♀Q♆	23	20	35
☿ Node S	23	27	58
♀□♂	24	7	25
☿⚼☊	24	7	35
☽△♀	24	8	22
☽□♃	24	14	05
☽☍♆	24	26	49
☽☌☊	24	28	28
☉⊻♆	25	10	23
☽□♄	25	15	24

DECEMBER —*concld.*	*d*	*h*	*m*
☽△♇	25	16	26
☉P☿	25	19	54
☽☍♅	25	21	52
☉40♀	26	7	41
☽△☿	26	10	50
☉ 150 ☊	26	11	06
☽☍♂	26	12	26
☽□♀	26	14	10
♂Q♇	26	15	06
☽△♃	26	15	43
♀80♅	26	21	09
☿40♆	26	23	02
☉ 40 ♅	26	24	07
♀ 150 ♃	27	8	33
☽△☉	27	8	33
☿✱♂	27	14	34
♂160☊	27	15	06
☽△♄	27	18	33
☽□♇	27	19	53
☉V☿	27	22	45
♀P♅	27	23	11
☿△♃	28	8	08
☿⚼♄	28	14	11
♀V♆	28	21	43
☽□☿	28	22	29
☽✱♀	28	24	25
♂✱♃	28	25	46
☽△♆	29	11	32
☽✱☊	29	13	20
Helio ♀☍♂	29	*15*	*47*
☽□☉	29	19	34
☽ Equat S	29	26	53
☽✱♇	29	27	07
☽△♅	30	9	28
☽☍♃	31	5	44
☽△♂	31	9	06
☽✱☿	31	15	34
☽□♆	31	21	23
☽□☊	31	22	59

Note— The 'Nonile' aspect which are formed at distances of 40° (1st nonile), 80° (2nd nonile), 120° (3rd nonile or trine) and 160° (4th nonile) are on the basis of one-ninth division of the circle of twelve *navamshas*. When two planets form the 'Nonile' aspect, they are in true conjunction in the *navamsha* chart.

The V-aspects of the Sun and the Moon, used by the ancient Indian astronomers, are of two kinds *viz.* the ***Vyatipata*** aspect when the sum of the tropical longitudes of the Sun and the Moon amounted to 180° (symbol—V), and the ***Vaidhriti*** aspect when it amounted to 360° (symbol—v). These aspects mutually between all other planets also have been shown. These two V-aspects like conjunctions and oppositions have a very close affinity with the parallel aspects, and latter generally taking place very near to the former four.

The *heliocentric aspects* are with reference to the places of planets as may be seen by an observer stationed in the Sun. Of these aspects, the conjunctions and oppositions are the most important. When two planets form the opposition aspect heliocentrically, both the planets are at that time invisible to each other having been intervened by the Sun situated between them. In case of conjunctions the outer planets is visible to the inner one, but the inner planet is not visible to the outer. This phenomena is similar to combustion or heliacal setting of planets as we see form the planet Earth.

Advance Ephemeris for 2000 A.D.

Nirayana longitudes of planets at 5-30 a.m. I.S.T. at interval of 8 days.

Date	Sun ☉	Moon ☽	Mercury ☿	Venus ♀	Mars ♂	Jupiter ♃	Saturn ♄	Uranus ♅	Neptune ♆	Pluto ♇	Rahu (True)	Rahu (Mean)
2000 A.D.	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
Jan. 1	8 16 00	6 13 26	8 07 16	7 07 07	10 03 43	0 01 23	0 16 33	9 20 56	9 09 19	7 17 35	3 10 08	3 11 13
2	8 17 02	6 25 28	8 08 49	7 08 19	10 04 30	0 01 25	0 16 32	9 20 59	9 09 22	7 17 37	3 10 04	3 11 10
10	8 25 11	10 01 00	8 21 28	7 18 01	10 10 42	0 01 51	0 16 26	9 21 24	9 09 39	7 17 53	3 09 49	3 10 44
18	9 03 20	1 18 44	9 04 35	7 27 47	10 16 54	0 02 31	0 16 28	9 21 50	9 09 57	7 18 08	3 09 51	3 10 19
26	9 11 28	5 14 20	9 18 14	8 07 35	10 23 04	0 03 21	0 16 37	9 22 17	9 10 15	7 18 22	3 09 50	3 09 53
Feb. 3	9 19 36	8 21 23	10 02 10	8 17 25	10 29 13	0 04 22	0 16 53	9 22 45	9 10 33	7 18 34	3 09 53	3 09 28
11	9 27 42	0 02 34	10 15 00	8 27 16	11 05 21	0 05 32	0 17 15	9 23 13	9 10 51	7 18 44	3 09 43	3 09 02
19	10 05 47	3 26 37	10 22 47	9 07 08	11 11 26	0 06 50	0 17 44	9 23 41	9 11 08	7 18 52	3 09 44	3 08 37
27	10 13 50	7 12 04	10 20 57	9 17 01	11 17 29	0 08 15	0 18 19	9 24 08	9 11 25	7 18 57	3 09 18	3 08 12
Mar. 6	10 21 52	10 19 14	10 13 05	9 26 54	11 23 29	0 09 47	0 18 59	9 24 34	9 11 40	7 19 01	3 09 14	3 07 46
14	10 29 52	2 09 11	10 08 58	10 06 47	11 29 27	0 11 24	0 19 44	9 24 59	9 11 54	7 19 03	3 08 35	3 07 21
22	11 07 49	6 00 02	10 11 14	10 16 40	0 05 22	0 13 06	0 20 32	9 25 22	9 12 07	7 19 02	3 07 58	3 06 55
30	11 15 44	9 07 21	10 17 59	10 26 33	0 11 14	0 14 52	0 21 25	9 25 43	9 12 18	7 18 59	3 07 24	3 06 30
Apr. 7	11 23 37	0 23 02	10 27 34	11 06 25	0 17 02	0 16 41	0 22 21	9 26 02	9 12 27	7 18 54	3 06 24	3 06 04
15	0 01 28	4 15 37	11 09 12	11 16 17	0 22 48	0 18 32	0 23 19	9 26 19	9 12 34	7 18 48	3 05 58	3 05 39
23	0 09 17	7 27 50	11 22 37	11 26 09	0 28 31	0 20 25	0 24 18	9 26 33	9 12 39	7 18 39	3 04 33	3 05 14
May 1	0 17 04	11 05 38	0 07 49	0 06 00	1 04 10	0 22 19	0 25 19	9 26 44	9 12 42	7 18 29	3 04 12	3 04 48
9	0 24 49	3 00 47	0 24 38	0 15 51	1 09 47	0 24 13	0 26 21	9 26 51	9 12 43	7 18 18	3 03 12	3 04 23
17	1 02 32	6 17 32	1 11 54	0 25 41	1 15 21	0 26 07	0 27 23	9 26 56	9 12 42	7 18 06	3 02 35	3 03 57
25	1 10 14	9 23 28	1 27 32	1 05 31	1 20 51	0 28 00	0 28 24	9 26 58	9 12 39	7 17 53	3 01 58	3 03 32
June 2	1 17 55	1 10 45	2 10 15	1 15 21	1 26 20	0 29 52	0 29 24	9 26 57	9 12 33	7 17 40	3 01 29	3 03 06
10	1 25 34	5 06 09	2 19 35	1 25 10	2 01 45	1 01 42	1 00 23	9 26 52	9 12 26	7 17 27	3 01 22	3 02 41
18	2 03 12	8 14 48	2 25 01	2 05 00	2 07 08	1 03 30	1 01 20	9 26 45	9 12 18	7 17 15	3 00 50	3 02 15
26	2 10 50	11 22 28	2 25 50	2 14 50	2 12 29	1 05 14	1 02 15	9 26 34	9 12 08	7 17 03	3 00 55	3 01 50
July 4	2 18 28	3 19 28	2 22 22	2 24 40	2 17 47	1 06 54	1 03 06	9 26 22	9 11 57	7 16 52	3 00 46	3 01 25
12	2 26 06	7 06 06	2 17 48	3 04 30	2 23 03	1 08 30	1 03 53	9 26 07	9 11 45	7 16 42	3 00 46	3 00 59
20	3 03 44	10 11 20	2 16 48	3 14 20	2 28 18	1 10 01	1 04 37	9 25 51	9 11 32	7 16 33	3 00 45	3 00 34
28	3 11 22	1 27 49	2 21 40	3 24 10	3 03 30	1 11 25	1 05 16	9 25 33	9 11 19	7 16 26	3 00 45	3 00 08
Aug. 5	3 19 01	5 24 36	3 02 19	4 04 00	3 08 41	1 12 43	1 05 50	9 25 14	9 11 06	7 16 21	3 00 38	2 29 43
13	3 26 41	9 02 20	3 17 07	4 13 51	3 13 51	1 13 53	1 06 18	9 24 55	9 10 53	7 16 18	3 00 42	2 29 17
21	4 04 23	0 11 55	4 03 18	4 23 40	3 18 58	1 14 54	1 06 40	9 24 36	9 10 41	7 16 17	3 00 13	2 28 52
29	4 12 06	4 06 11	4 18 46	5 03 30	3 24 05	1 15 46	1 06 56	9 24 17	9 10 30	7 16 18	3 00 09	2 28 27
Sept. 6	4 19 51	7 23 20	5 02 55	5 13 19	3 29 10	1 16 28	1 07 05	9 24 00	9 10 20	7 16 22	2 29 32	2 28 01
14	4 27 37	10 29 45	5 15 48	5 23 07	4 04 14	1 16 58	1 07 07	9 23 44	9 10 12	7 16 27	2 29 09	2 27 36
22	5 05 26	2 17 44	5 27 30	6 02 54	4 09 17	1 17 17	1 07 02	9 23 31	9 10 05	7 16 34	2 28 23	2 27 10
30	5 13 16	6 10 53	6 07 54	6 12 41	4 14 19	1 17 22	1 06 51	9 23 19	9 10 00	7 16 44	2 27 28	2 26 45
Oct. 8	5 21 09	9 18 43	6 16 27	6 22 26	4 19 19	1 17 15	1 06 32	9 23 11	9 09 57	7 16 55	2 27 00	2 26 19
16	5 29 04	1 02 28	6 21 32	7 02 10	4 24 18	1 16 55	1 06 08	9 23 05	9 09 56	7 17 07	2 25 41	2 25 54
24	6 07 01	4 24 52	6 19 52	7 11 53	4 29 17	1 16 23	1 05 39	9 23 02	9 09 57	7 17 22	2 25 16	2 25 29
Nov. 1	6 15 00	8 09 08	6 10 42	7 21 34	5 04 14	1 15 39	1 05 05	9 23 03	9 10 00	7 17 37	2 24 02	2 25 03
9	6 23 02	11 16 25	6 06 09	8 01 13	5 09 10	1 14 47	1 04 29	9 23 06	9 10 06	7 17 54	2 23 40	2 24 38
17	7 01 05	3 09 31	6 12 00	8 10 49	5 14 04	1 13 47	1 03 50	9 23 14	9 10 13	7 18 12	2 22 54	2 24 12
25	7 09 09	6 27 56	6 22 44	8 20 22	5 18 57	1 12 43	1 03 11	9 23 24	9 10 23	7 18 30	2 22 21	2 23 47
Dec. 3	7 17 16	10 04 27	7 04 49	8 29 50	5 23 48	1 11 37	1 02 33	9 23 37	9 10 34	7 18 49	2 22 08	2 23 21
11	7 25 23	1 20 12	7 17 13	9 09 12	5 28 37	1 10 34	1 01 57	9 23 53	9 10 47	7 19 07	2 21 47	2 22 56
19	8 03 31	5 15 42	7 29 42	9 18 27	6 03 24	1 09 36	1 01 25	9 24 12	9 11 02	7 19 25	2 21 48	2 22 30
27	8 11 40	8 25 35	8 12 21	9 27 32	6 08 08	1 08 46	1 00 58	9 24 33	9 11 17	7 19 43	2 21 36	2 22 05
32	8 16 46	10 24 50	8 20 24	10 03 06	6 11 04	1 08 19	1 00 44	9 24 47	9 11 28	7 19 54	2 21 39	2 21 49

ASTOTTARI DASA — Krittikadi & Ardradi (Balance of Dasa by longitude of Moon at birth)

Nakshatra		Long. of Moon			Krittikadi Dasa				Ardradi Dasa			
		s	°	'		y	m	d		y	m	d
1	Asvini	0	0	00	Venus	10	6	0	Rahu	6	0	0
2	Bharani	0	13	20		5	3	0		3	0	0
3	Krittika	0	26	40	Sun	6	0	0	Venus	21	0	0
4	Rohini	1	10	00		4	0	0		14	0	0
5	Mrigasiras	1	23	20		2	0	0		7	0	0
6	Ardra	2	6	40	Moon	15	0	0	Sun	6	0	0
7	Punarvasu	2	20	00		11	3	0		4	6	0
8	Pusya	3	3	20		7	6	0		3	0	0
9	Aslesa	3	16	40		3	9	0		1	6	0
10	Magha	4	0	00	Mars	8	0	0	Moon	15	0	0
11	P.Phalguni	4	13	20		5	4	0		10	0	0
12	U.Phalguni	4	26	40		2	8	0		5	0	0
13	Hasta	5	10	00	Mercury	17	0	0	Mars	8	0	0
14	Citra	5	23	20		12	9	0		6	0	0
15	Svati	6	6	40		8	6	0		4	0	0
16	Visakha	6	20	00		4	3	0		2	0	0
17	Anuradha	7	3	20	Saturn	10	0	0	Mercury	17	0	0
18	Jyestha	7	16	40		6	8	0		11	4	0
19	Mula	8	0	00		3	4	0		5	8	0
20	Purvasadha	8	13	20	Jupiter	19	0	0	Saturn	10	0	0
21	Uttarasadha	8	26	40		12	8	0		6	8	0
22	Sravana	9	10	00		6	4	0		3	4	0
23	Dhanistha	9	23	20	Rahu	12	0	0	Jupiter	19	0	0
24	Satabhisaj	10	6	40		8	0	0		12	8	0
25	P.Bhadrapada	10	20	00		4	0	0		6	4	0
26	U.Bhadrapada	11	3	20	Veuns	21	0	0	Rahu	12	0	0
27	Revati	11	16	40		15	9	0		9	0	0
1	Asvini	12	0	00		10	6	0		6	0	0

ASTOTTARI DASA AND ANTAR DASA

Antardasa	Sun (Ravi)—6						Moon (Chandra)—15						Mars (Mangala)—8							
	Sub Periods			Total			Sub Periods			Total			Sub Periods				Total			
	y	m	d	y	m	d	y	m	d	y	m	d	y	m	d	h	y	m	d	h
Sun	0	4	8	0	4	0		—			—			—				—		
Moon	0	10	0	1	2	0	2	1	0	2	1	0		—				—		
Mars	0	5	10	1	7	10	1	1	10	3	2	10	0	7	3	8	0	7	3	8
Mercury	0	11	10	2	6	20	2	4	10	5	6	20	1	3	3	8	1	10	6	16
Saturn	0	6	20	3	1	10	1	4	20	6	11	10	0	8	26	16	2	7	3	8
Jupiter	1	0	20	4	2	0	2	7	20	9	7	0	1	4	26	16	4	0	0	0
Rahu	0	8	0	4	10	0	1	8	0	11	3	0	0	10	20	0	4	10	20	0
Venus	1	2	0	6	0	0	2	11	0	14	2	0	1	6	20	0	6	5	10	0
Sun		—			—		0	10	0	15	0	0	0	5	10	0	6	10	20	00
Moon		—			—			—			—		1	1	10	0	8	0	0	0

Antardasa	Mercury (Budha)—17								Saturn (Sani)—10							
	Sub Periods				Total				Sub Periods				Total			
	y	m	d	h	y	m	d	h	y	m	d	h	y	m	d	h
Mercury	2	8	3	8	2	8	3	8		—				—		
Suturn	1	6	26	16	4	3	0	0	0	11	3	8	0	11	3	8
Jupiter	2	11	26	16	7	2	26	16	1	9	3	8	2	8	6	16
Rahu	1	10	20	0	9	1	16	16	1	1	10	0	3	9	16	16
Venus	3	3	20	0	12	5	16	16	1	11	10	0	5	8	26	16
Sun	0	11	10	0	13	4	16	16	0	6	20	0	6	3	16	16
Moon	2	4	10	0	15	8	26	16	1	4	20	0	7	8	6	16
Mars	1	3	3	8	17	0	0	0	0	8	26	16	8	5	3	8
Mercury		—				—			1	6	26	16	10	0	0	0

Antardasa	Jupiter (Brihaspati)—19								Rahu—12						Venus (Sukra)—21					
	Sub Periods				Total				Sub Periods			Total			Sub Periods			Total		
	y	m	d	h	y	m	d	h	y	m	d	y	m	d	y	m	d	y	m	d
Jupiter	3	4	3	8	3	4	3	8		—			—			—			—	
Rahu	2	1	10	0	5	5	13	8	1	4	0	1	4	0		—			—	
Venus	3	8	10	0	9	1	23	8	2	4	0	3	8	0	4	1	0	4	1	0
Sun	1	0	20	0	10	2	13	8	0	8	0	4	4	0	1	2	0	5	3	0
Moon	2	7	20	0	12	10	3	8	1	8	0	6	0	0	2	11	0	8	2	0
Mars	1	4	26	16	14	3	0	0	0	10	20	6	10	20	1	6	20	9	8	20
Mercury	2	11	26	16	17	2	26	16	1	10	20	8	9	10	3	3	20	13	0	10
Saturn	1	9	3	8	19	0	0	0	1	1	10	9	10	20	1	11	10	14	11	20
Jupiter		—				—			2	1	10	12	0	0	3	8	10	18	8	0
Rahu		—				—				—			—		2	4	0	21	0	0

Balance of Vimsottari Dasa by Longitude of Moon

Long. of Moon °	'	Moon in Mesha Simha, Dhanus	y	m	d	Moon in Vrisha Kanya, Makara	y	m	d	Moon in Mithuna Tula, Kumbha	y	m	d	Moon in Karkata Vrischika, Mina	y	m	d
0	0	**Ketu**	7	0	0	**Sun**	4	6	0	**Mars**	3	6	0	**Jupiter**	4	0	0
0	20		6	9	27		4	4	6		3	3	27		3	7	6
0	40		6	7	24		4	2	12		3	1	24		3	2	12
1	0		6	5	21		4	0	18		2	11	21		2	9	18
1	20		6	3	18		3	10	24		2	9	18		2	4	24
1	40		6	1	15		3	9	0		2	7	15		2	0	0
2	0		5	11	12		3	7	6		2	5	12		1	7	6
2	20		5	9	9		3	5	12		2	3	9		1	2	12
2	40		5	7	6		3	3	18		2	1	6		0	9	18
3	0		5	5	3		3	1	24		1	11	3		0	4	24
3	20		5	3	0		3	0	0		1	9	0	**Saturn**	19	0	0
3	40		5	0	27		2	10	6		1	6	27		18	6	9
4	0		4	10	24		2	8	12		1	4	24		18	0	18
4	20		4	8	21		2	6	18		1	2	21		17	6	27
4	40		4	6	18		2	4	24		1	0	18		17	1	6
5	0		4	4	15		2	3	0		0	10	15		16	7	15
5	20		4	2	12		2	1	6		0	8	12		16	1	24
5	40		4	0	9		1	11	12		0	6	9		15	8	3
6	0		3	10	6		1	9	18		0	4	6		15	2	12
6	20		3	8	3		1	7	24		0	2	3		14	8	21
6	40		3	6	0		1	6	0	**Rahu**	18	0	0		14	3	0
7	0		3	3	27		1	4	6		17	6	18		13	9	9
7	20		3	1	24		1	2	12		17	1	6		13	3	18
7	40		2	11	21		1	0	18		16	7	24		12	9	27
8	0		2	9	18		0	10	24		16	2	12		12	4	6
8	20		2	7	15		0	9	0		15	9	0		11	10	15
8	40		2	5	12		0	7	6		15	3	18		11	4	24
9	0		2	3	9		0	5	12		14	10	6		10	11	3
9	20		2	1	6		0	3	18		14	4	24		10	5	12
9	40		1	11	3		0	1	24		13	11	12		9	11	21
10	0		1	9	0	**Moon**	10	0	0		13	6	0		9	6	0
10	20		1	6	27		9	9	0		13	0	18		9	0	9
10	40		1	4	24		9	6	0		12	7	6		8	6	18
11	0		1	2	21		9	3	0		12	1	24		8	0	27
11	20		1	0	18		9	0	0		11	8	12		7	7	6
11	40		0	10	15		8	9	0		11	3	0		7	1	15
12	0		0	8	12		8	6	0		10	9	18		6	7	24
12	20		0	6	9		8	3	0		10	4	6		6	2	3
12	40		0	4	6		8	0	0		9	10	24		5	8	12
13	0		0	2	3		7	9	0		9	5	12		5	2	21
13	20	**Venus**	20	0	0		7	6	0		9	0	0		4	9	0
13	40		19	6	0		7	3	0		8	6	18		4	3	9
14	0		19	0	0		7	0	0		8	1	6		3	9	18
14	20		18	6	0		6	9	0		7	7	24		3	3	27
14	40		18	0	0		6	6	0		7	2	12		2	10	6
15	0		17	6	0		6	3	0		6	9	0		2	4	15
15	20		17	0	0		6	0	0		6	3	18		1	10	24
15	40		16	6	0		5	9	0		5	10	6		1	5	3
16	0		16	0	0		5	6	0		5	4	24		0	11	12
16	20		15	6	0		5	3	0		4	11	12		0	5	21
16	40		15	0	0		5	0	0		4	6	0	**Mercury**	17	0	0
17	0		14	6	0		4	9	0		4	0	18		16	6	27
17	20		14	0	0		4	6	0		3	7	6		16	1	24
17	40		13	6	0		4	3	0		3	1	24		15	8	21
18	0		13	0	0		4	0	0		2	8	12		15	3	18
18	20		12	6	0		3	9	0		2	3	0		14	10	15
18	40		12	0	0		3	6	0		1	9	18		14	5	12
19	0		11	6	0		3	3	0		1	4	6		14	0	9

Balance of Vimsottari Dasa by Longitude of Moon—contd.

Long. of Moon		Moon in Mesha Simha, Dhanus				Moon in Vrisha Kanya, Makara				Moon in Mithuna Tula, Kumbha				Moon in Karkata Vrischika, Mina			
°	′		*y*	*m*	*d*		*y*	*m*	*d*		*y*	*m*	*d*		*y*	*m*	*d*
19	0	**Venus**	11	6	0	**Moon**	3	3	0	**Rahu**	1	4	6	**Merc.**	14	0	9
19	20		11	0	0		3	0	0		0	10	24		13	7	6
19	40		10	6	0		2	9	0		0	5	12		13	2	3
20	0		10	0	0		2	6	0	**Jupiter**	16	0	0		12	9	0
20	20		9	6	0		2	3	0		15	7	6		12	3	27
20	40		9	0	0		2	0	0		15	2	12		11	10	24
21	0		8	6	0		1	9	0		14	9	18		11	5	21
21	20		8	0	0		1	6	0		14	4	24		11	0	18
21	40		7	6	0		1	3	0		14	0	0		10	7	15
22	0		7	0	0		1	0	0		13	7	6		10	2	12
22	20		6	6	0		0	9	0		13	2	12		9	9	9
22	40		6	0	0		0	6	0		12	9	18		9	4	6
23	0		5	6	0		0	3	0		12	4	24		8	11	3
23	20		5	0	0	**Mars**	7	0	0		12	0	0		8	6	0
23	40		4	6	0		6	9	27		11	7	6		8	0	27
24	0		4	0	0		6	7	24		11	2	12		7	7	24
24	20		3	6	0		6	5	21		10	9	18		7	2	21
24	40		3	0	0		6	3	18		10	4	24		6	9	18
25	0		2	6	0		6	1	15		10	0	0		6	4	15
25	20		2	0	0		5	11	12		9	7	6		5	11	12
25	40		1	6	0		5	9	9		9	2	12		5	6	9
26	0		1	0	0		5	7	6		8	9	18		5	1	6
26	20		0	6	0		5	5	3		8	4	24		4	8	3
26	40	**Sun**	6	0	0		5	3	0		8	0	0		4	3	0
27	0		5	10	6		5	0	27		7	7	6		3	9	27
27	20		5	8	12		4	10	24		7	2	12		3	4	24
27	40		5	6	18		4	8	21		6	9	18		2	11	21
28	0		5	4	24		4	6	18		6	4	24		2	6	18
28	20		5	3	0		4	4	15		6	0	0		2	1	15
28	40		5	1	6		4	2	12		5	7	6		1	8	12
29	0		4	11	12		4	0	9		5	2	12		1	3	9
29	20		4	9	18		3	10	6		4	9	18		0	10	6
29	40		4	7	24		3	8	3		4	4	24		0	5	3
30	0		4	6	0		3	6	0		4	0	0		0	0	0

Proportional Parts For Dasa of Planets

(To be subtracted from the balance of *dasa* for increase by minutes of the longitude of Moon)

	Ketu (7y)		Venus (20y)		Sun (6y)		Moon (10y)		Mars (7y)		Rahu (18y)		Jupiter (16y)		Saturn (19y)		Merc. (17y)		
	m	*d*	*m*	*d*	*m*	*d*	*m*	*d*	*m*	*d*	*m*	*d*	*m*	*d*	*m*	*d*	*m*	*d*	
1	0	3	0	9	0	3	0	5	0	3	0	8	0	7	0	9	0	8	1
2	0	6	0	18	0	5	0	9	0	6	0	16	0	14	0	17	0	15	2
3	0	9	0	27	0	8	0	14	0	9	0	24	0	22	0	26	0	23	3
4	0	13	1	6	0	11	0	18	0	13	1	2	0	29	1	4	1	1	4
5	0	16	1	15	0	14	0	23	0	16	1	11	1	6	1	13	1	8	5
6	0	19	1	24	0	16	0	27	0	19	1	19	1	13	1	21	1	16	6
7	0	22	2	3	0	19	1	2	0	22	1	27	1	20	2	0	1	24	7
8	0	25	2	12	0	22	1	6	0	25	2	5	1	28	2	8	2	1	8
9	0	28	2	21	0	24	1	11	0	28	2	13	2	5	2	17	2	9	9
10	1	1	3	0	0	27	1	15	1	1	2	21	2	12	2	26	2	17	10
15	1	17	4	15	1	11	2	8	1	17	4	2	3	18	4	8	3	25	15
20	2	3	6	0	1	24	3.	0	2	3	5	12	4	24	5	21	5	3	20

VIMSOTTARI DASA AND ANTARDASA

Antardasa	Sun (Ravi)—6						Moon (Chandra)—10						Mars (Mangala)—7					
	Sub Periods			Total			Sub Periods			Total			Sub Periods			Total		
	y	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*
Sun	0	3	18	0	3	18		—			—			—			—	
Moon	0	6	0	0	9	18	0	10	0	0	10	0		—			—	
Mars	0	4	6	1	1	24	0	7	0	1	5	0	0	4	27	0	4	27
Rahu	0	10	24	2	0	18	1	6	0	2	11	0	1	0	18	1	5	15
Jupiter	0	9	18	2	10	6	1	4	0	4	3	0	0	11	6	2	4	21
Saturn	0	11	12	3	9	18	1	7	0	5	10	0	1	1	9	3	6	0
Mercury	0	10	6	4	7	24	1	5	0	7	3	0	0	11	27	4	5	27
Ketu	0	4	6	5	0	0	0	7	0	7	10	0	0	4	27	4	10	24
Venus	1	0	0	6	0	0	1	8	0	9	6	0	1	2	0	6	0	24
Sun		—			—		0	6	0	10	0	0	0	4	6	6	5	0
Moon		—			—			—			—		0	7	0	7	0	0

Antardasa	Rahu—18						Jupiter (Brihaspati)—16						Saturn (Sani)—19					
	Sub Periods			Total			Sub Periods			Total			Sub Periods			Total		
	y	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*
Rahu	2	8	12	2	8	12		—			—			—			—	
Jupiter	2	4	24	5	1	6	2	1	18	2	1	18		—			—	
Saturn	2	10	6	7	11	12	2	6	12	4	8	0	3	0	3	3	0	3
Mercury	2	6	18	10	6	0	2	3	6	6	11	6	2	8	9	5	8	12
Ketu	1	0	18	11	6	18	0	11	6	7	10	12	1	1	9	6	9	21
Venus	3	0	0	14	6	18	2	8	0	10	6	12	3	2	0	9	11	21
Sun	0	10	24	15	5	12	0	9	18	11	4	0	0	11	12	10	11	3
Moon	1	6	0	16	11	12	1	4	0	12	8	0	1	7	0	12	6	3
Mars	1	0	18	18	0	0	0	11	6	13	7	6	1	1	9	13	7	12
Rahu		—			—		2	4	24	16	0	0	2	10	6	16	5	18
Jupiter		—			—			—			—		2	6	12	19	0	0

Antardasa	Mercury (Budha)—17						Ketu—7						Venus (Sukra)—20					
	Sub Periods			Total			Sub Periods			Total			Sub Periods			Total		
	y	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*	*y*	*m*	*d*
Mercury	2	4	27	2	4	27		—			—			—			—	
Ketu	0	11	27	3	4	24	0	4	27	0	4	27		—			—	
Venus	2	10	0	6	2	24	1	2	0	1	6	27	3	4	0	3	4	0
Sun	0	10	6	7	1	0	0	4	6	1	11	3	1	0	0	4	4	0
Moon	1	5	0	8	6	0	0	7	0	2	6	3	1	8	0	6	0	0
Mars	0	11	27	9	5	27	0	4	27	2	11	0	1	2	0	7	2	0
Rahu	2	6	18	12	0	15	1	0	18	3	11	18	3	0	0	10	2	0
Jupiter	2	3	6	14	3	21	0	11	6	4	10	24	2	8	0	12	10	0
Saturn	2	8	9	17	0	0	1	1	9	6	0	3	3	2	0	16	0	0
Mercury		—			—		0	11	27	7	0	0	2	10	0	18	10	0
Ketu		—			—			—			—		1	2	0	20	0	0

VIMSOTTARI DASA — Sub-Sub Periods

SUN—Sub-Periods — 6 Years

SUN — Inter-Periods

SUN—Sun	m	d	h
Sun	0	5	10
Moon	0	9	0
Mars	0	6	7
Rahu	0	16	5
Jupiter	0	14	10
Saturn	0	17	2
Mercury	0	15	7
Ketu	0	6	7
Venus	0	18	0
Total	**3**	**18**	**0**

SUN—Moon	m	d	h
Moon	0	15	0
Mars	0	10	12
Rahu	0	27	0
Jupiter	0	24	0
Saturn	0	28	12
Mercury	0	25	12
Ketu	0	10	12
Venus	1	0	0
Sun	0	9	0
Total	**6**	**0**	**0**

SUN—Mars	m	d	h
Mars	0	7	8
Rahu	0	18	22
Jupiter	0	16	19
Saturn	0	19	23
Mercury	0	17	21
Ketu	0	7	8
Venus	0	21	0
Sun	0	6	7
Moon	0	10	12
Total	**4**	**6**	**0**

SUN—Rahu	m	d	h
Rahu	1	18	14
Jupiter	1	13	5
Saturn	1	21	7
Mercury	1	15	22
Ketu	0	18	21
Venus	1	24	0
Sun	0	16	5
Moon	0	27	0
Mars	0	18	22
Total	**10**	**24**	**0**

SUN—Jupiter	m	d	h
Jupiter	1	8	10
Saturn	1	15	14
Mercury	1	10	19
Ketu	0	16	19
Venus	1	18	0
Sun	0	14	10
Moon	0	24	0
Mars	0	16	19
Rahu	1	13	5
Total	**9**	**18**	**0**

SUN—Saturn	m	d	h
Saturn	1	24	3
Mercury	1	18	11
Ketu	0	19	23
Venus	1	27	0
Sun	0	17	2
Moon	0	28	12
Mars	0	19	23
Rahu	1	21	7
Jupiter	1	15	15
Total	**11**	**12**	**0**

SUN—Mercury	m	d	h
Mercury	1	13	8
Ketu	0	17	20
Venus	1	21	0
Sun	0	15	7
Moon	0	25	12
Mars	0	17	21
Rahu	1	15	22
Jupiter	1	10	19
Saturn	1	18	11
Total	**10**	**6**	**0**

SUN—Ketu	m	d	h
Ketu	0	7	8
Venus	0	21	0
Sun	0	6	7
Moon	0	10	12
Mars	0	7	8
Rahu	0	18	22
Jupiter	0	16	20
Saturn	0	19	23
Mercury	0	17	20
Total	**4**	**6**	**0**

SUN—Venus	m	d	h
Venus	2	0	0
Sun	0	18	0
Moon	1	0	0
Mars	0	21	0
Rahu	1	24	0
Jupiter	1	18	0
Saturn	1	27	0
Mercury	1	21	0
Ketu	0	21	0
Total	**12**	**0**	**0**

MOON—Sub-Periods — 10 Years

MOON — Inter-Periods

MOON—Moon	m	d	h
Moon	0	25	0
Mars	0	17	12
Rahu	1	15	0
Jupiter	1	10	0
Saturn	1	17	12
Mercury	1	12	12
Ketu	0	17	12
Venus	1	20	0
Sun	0	15	0
Total	**10**	**0**	**0**

MOON—Mars	m	d	h
Mars	0	12	6
Rahu	1	1	12
Jupiter	0	28	0
Saturn	1	3	6
Mercury	0	29	18
Ketu	0	12	6
Venus	1	5	0
Sun	0	10	12
Moon	0	17	12
Total	**7**	**0**	**0**

MOON—Rahu	m	d	h
Rahu	2	21	0
Jupiter	2	12	0
Saturn	2	25	12
Mercury	2	16	12
Ketu	1	1	12
Venus	3	0	12
Sun	0	27	0
Moon	1	15	0
Mars	1	1	0
Total	**18**	**0**	**0**

VIMSOTTARI DASA — SUB-SUB PERIODS

MOON—SUB-PERIODS — 10 YEARS

MOON — Inter-Periods

MOON—Jupiter	m	d	h
Jupiter	2	4	0
Saturn	2	16	0
Mercury	2	8	0
Ketu	0	28	0
Venus	2	20	0
Sun	0	24	0
Moon	1	10	0
Mars	0	28	0
Rahu	2	12	0
Total	**16**	**0**	**0**

MOON—Saturn	m	d	h
Saturn	3	0	6
Mercury	2	20	18
Ketu	1	3	6
Venus	3	5	0
Sun	0	28	12
Moon	1	17	12
Mars	1	3	6
Rahu	2	25	12
Jupiter	2	16	0
Total	**19**	**0**	**0**

MOON—Mercury	m	d	h
Mercury	2	12	18
Ketu	0	29	18
Venus	2	25	0
Sun	0	25	0
Moon	1	12	12
Mars	0	29	18
Rahu	2	16	12
Jupiter	2	8	0
Saturn	2	20	18
Total	**17**	**0**	**0**

MOON—Ketu	m	d	h
Ketu	0	12	6
Venus	1	5	0
Sun	0	10	12
Moon	0	17	12
Mars	0	12	6
Rahu	1	1	12
Jupiter	0	28	0
Saturn	1	3	6
Mercury	0	29	18
Total	**7**	**0**	**0**

MOON—Venus	m	d	h
Venus	3	10	10
Sun	1	0	0
Moon	1	20	0
Mars	1	5	0
Rahu	3	0	0
Jupiter	2	20	0
Saturn	3	5	0
Mercury	2	25	0
Ketu	1	5	0
Total	**20**	**0**	**0**

MOON—Sun	m	d	h
Sun	0	9	0
Moon	0	15	0
Mars	0	10	12
Rahu	0	27	0
Jupiter	0	24	0
Saturn	0	28	12
Mercury	0	25	12
Ketu	0	10	12
Venus	1	0	0
Total	**6**	**0**	**0**

MARS—SUB-PERIODS — 7 YEARS

MARS — Inter-Periods

MARS—Mars	m	d	h
Mars	0	8	13.8
Rahu	0	22	1.2
Jupiter	0	19	14.4
Saturn	0	23	6.6
Mercury	0	20	19.8
Ketu	0	8	13.8
Venus	0	24	12.0
Sun	0	7	8.4
Moon	0	12	6.0
Total	**4**	**27**	**0.0**

MARS—Rahu	m	d	h
Rahu	1	26	16.8
Jupiter	1	20	9.6
Saturn	1	29	20.4
Mercury	1	23	13.2
Ketu	0	22	1.2
Venus	2	3	0.0
Sun	0	18	21.6
Moon	1	1	12.0
Mars	0	22	1.2
Total	**12**	**18**	**0.0**

MARS—Jupiter	m	d	h
Jupiter	1	14	19.2
Saturn	1	23	4.8
Mercury	1	17	14.4
Ketu	0	19	14.4
Venus	1	26	0.0
Sun	0	16	19.2
Moon	0	28	0.0
Mars	0	19	14.4
Rahu	1	20	9.6
Total	**11**	**6**	**0.0**

MARS—Saturn	m	d	h
Saturn	2	3	4.2
Mercury	1	26	12.6
Ketu	0	23	6.6
Venus	2	6	12.0
Sun	0	19	22.8
Moon	1	3	6.0
Mars	0	23	6.6
Rahu	1	29	20.4
Jupiter	1	23	4.8
Total	**13**	**9**	**0.0**

MARS—Mercury	m	d	h
Mercury	1	20	13.8
Ketu	0	20	19.8
Venus	1	29	12.0
Sun	0	17	20.4
Moon	0	29	18.0
Mars	0	20	19.8
Rahu	1	23	13.2
Jupiter	1	17	14.4
Saturn	1	26	12.6
Total	**11**	**17**	**0.0**

MARS—Ketu	m	d	h
Ketu	0	8	13.8
Venus	0	24	12.0
Sun	0	7	8.4
Moon	0	12	6.0
Mars	0	8	13.8
Rahu	0	22	1.2
Jupiter	0	19	14.4
Saturn	0	23	6.6
Mercury	0	20	19.8
Total	**4**	**27**	**0.0**

VIMSOTTARI DASA — SUB-SUB PERIODS

MARS—SUB -PERIODS — 7 YEARS

MARS — Inter-Periods

MARS—Venus

	m	d	h
Venus	2	10	0
Sun	0	21	0
Moon	1	5	0
Mars	0	24	12
Rahu	2	3	0
Jupiter	1	26	0
Saturn	2	6	12
Mercury	1	29	12
Ketu	0	24	12
Total	**14**	**0**	**0**

MARS—Sun

	m	d	h
Sun	0	6	7.2
Moon	0	10	12.0
Mars	0	7	8.4
Rahu	0	18	21.6
Jupiter	0	16	19.2
Saturn	0	19	22.8
Mercury	0	17	20.4
Ketu	0	7	8.4
Venus	0	21	0.0
Total	**4**	**6**	**0**

MARS—Moon

	m	d	h
Moon	0	17	12
Mars	0	12	6
Rahu	1	1	12
Jupiter	0	28	0
Saturn	1	3	6
Mercury	0	29	18
Ketu	0	12	6
Venus	1	5	0
Sun	0	10	12
Total	**7**	**0**	**0**

RAHU—SUB -PERIODS — 18 YEARS

RAHU — Inter-Periods

RAHU—Rahu

	m	d	h
Rahu	4	25	19.2
Jupiter	4	9	14.4
Saturn	5	3	21.6
Mercury	4	17	16.8
Ketu	1	26	16.8
Venus	5	12	0.0
Sun	1	18	14.4
Moon	2	21	0.0
Mars	1	26	16.8
Total	**32**	**12**	**0.0**

RAHU—Jupiter

	m	d	h
Jupiter	3	25	4.8
Saturn	4	16	19.2
Mercury	4	2	9.6
Ketu	1	20	9.6
Venus	4	24	0.0
Sun	1	13	4.0
Moon	2	12	0.8
Mars	1	20	9.6
Rahu	4	9	14.4
Total	**28**	**24**	**0.0**

RAHU—Saturn

	m	d	h
Saturn	5	12	10.8
Mercury	4	25	8.4
Ketu	1	29	20.4
Venus	5	21	0.0
Sun	1	21	7.2
Moon	2	25	12.0
Mars	1	29	20.4
Rahu	5	3	21.6
Jupiter	4	16	19.2
Total	**34**	**6**	**0.0**

RAHU—Mercury

	m	d	h
Mercury	4	10	1.2
Ketu	1	23	13.2
Venus	5	3	0.0
Sun	1	15	21.6
Moon	2	16	12.0
Mars	1	23	13.2
Rahu	4	17	16.8
Jupiter	4	2	9.6
Saturn	4	25	8.4
Total	**30**	**18**	**0.0**

RAHU—Ketu

	m	d	h
Ketu	0	22	1.2
Venus	2	3	0.0
Sun	0	18	21.6
Moon	1	1	12.0.
Mars	0	22	1.2
Rahu	1	26	16.8
Jupiter	1	20	9.6
Saturn	1	29	20.4
Mercury	1	23	13.2
Total	**12**	**18**	**0.0**

RAHU—Venus

	m	d	h
Venus	6	0	0
Sun	1	24	0
Moon	3	0	0
Mars	2	3	0
Rahu	5	12	0
Jupiter	4	24	0
Saturn	5	21	0
Mercury	5	3	0
Ketu	2	3	0
Total	**36**	**0**	**0**

RAHU—Sun

	m	d	h
Sun	0	16	4.8
Moon	0	27	0.0
Mars	0	18	21.6
Rahu	1	18	14.4
Jupiter	1	13	4.8
Saturn	1	21	7.2
Mercury	1	15	21.6
Ketu	0	18	21.6
Venus	1	24	0.0
Total	**10**	**24**	**0.0**

RAHU—Moon

	m	d	h
Moon	1	15	0
Mars	1	1	12
Rahu	2	21	0
Jupiter	2	12	0
Saturn	2	25	12
Mercury	2	16	12
Ketu	1	1	12
Venus	3	0	0
Sun	0	27	0
Total	**18**	**0**	**0**

RAHU—Mars

	m	d	h
Mars	0	22	1.2
Rahu	1	26	16.8
Jupiter	1	20	9.6
Saturn	1	29	20.4
Mercury	1	23	13.2
Ketu	0	22	1.2
Venus	2	3	0.0
Sun	0	18	21.6
Moon	1	1	12.0
Total	**12**	**18**	**0.0**

VIMSOTTARI DASA — SUB-SUB PERIODS

JUPITER—SUB-PERIODS — 16 YEARS

JUPITER — Inter-Periods

JUPITER—Jupiter	m	d	h
Jupiter	3	12	9.6
Saturn	4	1	14.4
Mercury	3	18	19.2
Ketu	1	14	19.2
Venus	4	8	0.0
Sun	1	8	9.6
Moon	2	4	0.0
Mars	1	14	19.2
Rahu	3	25	4.8
Total	**25**	**18**	**0.0**

JUPITER—Saturn	m	d	h
Saturn	4	24	9.6
Mercury	4	9	4.8
Ketu	1	23	4.8
Venus	5	2	0.0
Sun	1	15	14.4
Moon	2	16	0.0
Mars	1	23	4.8
Rahu	4	16	19.2
Jupiter	4	1	14.4
Total	**30**	**12**	**0.0**

JUPITER—Mercury	m	d	h
Mercury	3	25	14.4
Ketu	1	17	14.4
Venus	4	16	0.0
Sun	1	10	19.2
Moon	2	8	0.0
Mars	1	17	14.4
Rahu	4	2	9.6
Jupiter	3	18	19.2
Saturn	4	9	4.8
Total	**27**	**6**	**0.0**

JUPITER—Ketu	m	d	h
Ketu	0	19	14.4
Venus	1	26	0.0
Sun	0	16	19.2
Moon	0	28	0.0
Mars	0	19	14.4
Rahu	1	20	9.6
Jupiter	1	14	19.2
Saturn	1	23	4.8
Mercury	1	17	14.4
Total	**11**	**6**	**0.0**

JUPITER—Venus	m	d	h
Venus	5	10	0
Sun	1	18	0
Moon	2	20	0
Mars	1	26	0
Rahu	4	24	0
Jupiter	4	8	0
Saturn	5	2	0
Mercury	4	16	0
Ketu	1	26	0
Total	**32**	**0**	**0**

JUPITER—Sun	m	d	h
Sun	0	14	9.6
Moon	0	24	0.0
Mars	0	16	19.2
Rahu	1	13	4.8
Jupiter	1	8	9.6
Saturn	1	15	14.4
Mercury	1	10	19.2
Ketu	0	16	19.2
Venus	1	18	0.0
Total	**9**	**18**	**0.0**

JUPITER—Moon	m	d	h
Moon	1	10	0
Mars	0	28	0
Rahu	2	12	0
Jupiter	2	4	0
Saturn	2	16	0
Mercury	2	8	0
Ketu	0	28	0
Venus	2	20	0
Sun	0	24	0
Total	**16**	**0**	**0**

JUPITER—Mars	m	d	h
Mars	0	19	14.4
Rahu	1	20	9.6
Jupiter	1	14	19.2
Saturn	1	23	4.8
Mercury	1	17	14.4
Ketu	0	19	14.4
Venus	1	26	0.0
Sun	0	16	19.2
Moon	0	28	0.0
Total	**11**	**6**	**0.0**

JUPITER—Rahu	m	d	h
Rahu	4	9	14.4
Jupiter	3	25	4.8
Saturn	4	16	19.2
Mercury	4	2	9.6
Ketu	1	20	9.6
Venus	4	24	0.0
Sun	1	13	4.8
Moon	2	12	0.0
Mars	1	20	9.6
Total	**28**	**24**	**0.0**

SATURN—SUB-PERIODS — 19 YEARS

SATURN — Inter-Periods

SATURN—Saturn	m	d	h
Saturn	5	21	11.4
Mercury	5	3	10.2
Ketu	2	3	4.2
Venus	6	0	12.0
Sun	1	24	3.6
Moon	3	0	6.0
Mars	2	3	4.2
Rahu	5	12	10.8
Jupiter	4	24	9.6
Total	**36**	**3**	**0.0**

SATURN—Mercury	m	d	h
Mercury	4	17	6.6
Ketu	1	26	12.6
Venus	5	11	12.0
Sun	1	18	10.8
Moon	2	20	18.0
Mars	1	26	12.6
Rahu	4	25	8.4
Jupiter	4	9	4.8
Saturn	5	3	10.2
Total	**32**	**9**	**0.0**

SATURN—Ketu	m	d	h
Ketu	0	23	6.6
Venus	2	6	12.0
Sun	0	19	22.8
Moon	1	3	6.0
Mars	0	23	6.6
Rahu	1	29	20.6
Jupiter	1	23	4.8
Saturn	2	3	4.1
Mercury	1	26	12.5
Total	**13**	**9**	**0.0**

VIMSOTTARI DASA — Sub-Sub Periods

SATURN—Sub-Periods — 19 Years

SATURN — Inter-Periods

SATURN—Venus	m	d	h
Venus	6	10	0
Sun	1	27	0
Moon	3	5	0
Mars	2	6	12
Rahu	5	21	0
Jupiter	5	2	0
Saturn	6	0	12
Mercury	5	11	12
Ketu	2	6	12
Total	**38**	**0**	**0**

SATURN—Sun	m	d	h
Sun	0	17	2.4
Moon	0	28	12.0
Mars	0	19	22.8
Rahu	1	21	7.2
Jupiter	1	15	14.4
Saturn	1	24	3.6
Mercury	1	18	10.8
Ketu	0	19	22.8
Venus	1	27	0.0
Total	**11**	**12**	**0.0**

SATURN—Moon	m	d	h
Moon	1	17	12
Mars	1	3	6
Rahu	2	25	12
Jupiter	2	16	0
Saturn	3	0	6
Mercury	2	20	18
Ketu	1	3	6
Venus	3	5	0
Sun	0	28	12
Total	**19**	**0**	**0**

SATURN—Mars	m	d	h
Mars	0	23	6.6
Rahu	1	29	20.4
Jupiter	1	23	4.8
Saturn	2	3	4.2
Mercury	1	26	12.6
Ketu	0	23	6.6
Venus	2	6	12.0
Sun	0	19	22.8
Moon	1	3	6.0
Total	**13**	**9**	**0.0**

SATURN—Rahu	m	d	h
Rahu	5	3	21.6
Jupiter	4	16	19.2
Saturn	5	12	10.8
Mercury	4	25	8.4
Ketu	1	29	20.4
Venus	5	21	0.0
Sun	1	21	7.2
Moon	2	25	12.0
Mars	1	29	20.4
Total	**34**	**6**	**0.0**

SATURN—Jupiter	m	d	h
Jupiter	4	1	14.4
Saturn	4	24	9.6
Mercury	4	9	4.8
Ketu	1	23	4.8
Venus	5	2	0.0
Sun	1	15	14.4
Moon	2	16	0.0
Mars	1	23	4.8
Rahu	4	16	19.2
Total	**30**	**12**	**0.0**

MERCURY—Sub-Periods — 17 Years

MERCURY — Inter-Periods

MERCURY—Mercury	m	d	h
Mercury	4	2	19.8
Ketu	1	20	13.8
Venus	4	24	12.0
Sun	1	13	8.4
Moon	2	12	6.0
Mars	1	20	13.8
Rahu	4	10	1.2
Jupiter	3	25	14.4
Saturn	4	17	6.6
Total	**28**	**27**	**0.0**

MERCURY—Ketu	m	d	h
Ketu	0	20	19.8
Venus	1	29	12.0
Sun	0	17	20.4
Moon	0	29	18.0
Mars	0	20	19.8
Rahu	1	23	13.2
Jupiter	1	17	14.4
Saturn	1	26	12.6
Mercury	1	20	13.8
Total	**11**	**27**	**0.0**

MERCURY—Venus	m	d	h
Venus	5	20	0
Sun	1	21	0
Moon	2	25	0
Mars	1	29	12
Rahu	5	3	0
Jupiter	4	16	0
Saturn	5	11	12
Mercury	4	24	12
Ketu	1	29	12
Total	**34**	**0**	**0**

MERCURY—Sun	m	d	h
Sun	0	15	7.2
Moon	0	25	12.0
Mars	0	17	20.4
Rahu	1	15	21.6
Jupiter	1	10	19.2
Saturn	1	18	10.8
Mercury	1	13	8.4
Ketu	0	17	20.4
Venus	1	21	0.0
Total	**10**	**6**	**0.0**

MERCURY—Moon	m	d	h
Moon	1	12	12
Mars	0	29	18
Rahu	2	16	12
Jupiter	2	8	0
Saturn	2	20	18
Mercury	2	12	6
Ketu	0	29	18
Venus	2	25	0
Sun	0	25	12
Total	**17**	**0**	**0**

MERCURY—Mars	m	d	h
Mars	0	20	19.8
Rahu	1	23	13.2
Jupiter	1	17	14.4
Saturn	1	26	12.6
Mercury	1	20	13.8
Ketu	0	20	19.8
Venus	1	29	12.0
Sun	0	17	20.4
Moon	0	29	18.0
Total	**11**	**27**	**0.0**

VIMSOTTARI DASA — Sub-Sub Periods

MERCURY—Sub-Periods — 17 Years

MERCURY — Inter Periods

MERCURY—Rahu	m	d	h
Rahu	4	17	16.8
Jupiter	4	2	9.6
Saturn	4	25	8.4
Mercury	4	10	1.2
Ketu	1	23	13.2
Venus	5	3	0.0
Sun	1	15	21.6
Moon	2	16	12.0
Mars	1	23	13.2
Total	**30**	**18**	**0.0**

MERCURY—Jupiter	m	d	h
Jupiter	3	18	19.2
Saturn	4	9	4.8
Mercury	3	25	14.4
Ketu	1	17	14.4
Venus	4	16	0.0
Sun	1	10	19.2
Moon	2	8	0.0
Mars	1	17	14.4
Rahu	4	2	9.6
Total	**27**	**6**	**0.0**

MERCURY—Saturn	m	d	h
Saturn	5	3	10.2
Mercury	4	17	6.6
Ketu	1	26	12.6
Venus	5	11	12.0
Sun	1	18	10.8
Moon	2	20	18.0
Mars	1	26	12.6
Rahu	4	25	8.4
Jupiter	4	9	4.8
Total	**32**	**9**	**0.0**

KETU—Sub-Periods — 7 Years

KETU — Inter-Periods

KETU—Ketu	m	d	h
Ketu	0	8	13.8
Venus	0	24	12.0
Sun	0	7	8.4
Moon	0	12	6.0
Mars	0	8	13.8
Rahu	0	22	1.2
Jupiter	0	19	14.4
Saturn	0	23	6.6
Mercury	0	20	19.8
Total	**4**	**27**	**0.0**

KETU—Venus	m	d	h
Venus	2	10	0
Sun	0	21	0
Moon	1	5	0
Mars	0	24	12
Rahu	2	3	0
Jupiter	1	26	0
Saturn	2	6	12
Mercury	1	29	12
Ketu	0	24	12
Total	**14**	**0**	**0**

KETU—Sun	m	d	h
Sun	0	6	7.2
Moon	0	10	12.0
Mars	0	7	8.4
Rahu	0	18	21.6
Jupiter	0	16	19.2
Saturn	0	19	22.8
Mercury	0	17	20.4
Ketu	0	7	8.4
Venus	0	21	0.0
Total	**4**	**6**	**0.0**

KETU—Moon	m	d	h
Moon	0	17	12.0
Mars	0	12	6.0
Rahu	1	1	12.0
Jupiter	0	28	0.0
Saturn	1	3	6.0
Mercury	0	29	18.8
Ketu	0	12	6.0
Venus	1	5	0.0
Sun	0	10	12.0
Total	**7**	**0**	**0.0**

KETU—Mars	m	d	h
Mars	0	8	13.8
Rahu	0	22	1.2
Jupiter	0	19	14.4
Saturn	0	23	6.6
Mercury	0	20	19.8
Ketu	0	8	13.8
Venus	0	24	12.0
Sun	0	7	8.4
Moon	0	12	6.0
Total	**4**	**27**	**0.0**

KETU—Rahu	m	d	h
Rahu	1	26	16.8
Jupiter	1	20	9.6
Saturn	1	29	20.4
Mercury	1	23	13.2
Ketu	0	22	1.2
Venus	2	3	0.0
Sun	0	18	21.6
Moon	1	1	12.0
Mars	0	22	1.2
Total	**12**	**18**	**0.0**

KETU—Jupiter	m	d	h
Jupiter	1	14	19.2
Saturn	1	23	4.8
Mercury	1	17	14.4
Ketu	0	19	14.4
Venus	1	26	0.0
Sun	0	16	19.2
Moon	0	28	0.0
Mars	0	19	14.4
Rahu	1	20	9.6
Total	**11**	**6**	**0.0**

KETU—Saturn	m	d	h
Saturn	2	3	4.2
Mercury	1	26	12.6
Ketu	0	23	6.6
Venus	2	6	12.0
Sun	0	19	22.8
Moon	1	3	6.0
Mars	0	23	6.6
Rahu	1	29	20.4
Jupiter	1	23	4.8
Total	**13**	**9**	**0.0**

KETU—Mercury	m	d	h
Mercury	1	20	13.8
Ketu	0	20	19.8
Venus	1	29	12.0
Sun	0	17	20.4
Moon	0	29	18.0
Mars	0	20	19.8
Rahu	1	23	13.2
Jupiter	1	17	14.4
Saturn	1	26	12.6
Total	**11**	**27**	**0.0**

VIMSOTTARI DASA — Sub-Sub Periods

VENUS—Sub -Periods — 20 Years

VENUS — Inter Periods

VENUS—Venus

	m	d	h
Venus	6	20	0
Sun	2	0	0
Moon	3	10	0
Mars	2	10	0
Rahu	6	0	0
Jupiter	5	10	0
Saturn	6	10	0
Mercury	5	20	0
Ketu	2	10	0
Total	**40**	**0**	**0**

VENUS—Sun

	m	d	h
Sun	0	18	0
Moon	1	0	0
Mars	0	21	0
Rahu	1	24	0
Jupiter	1	18	0
Saturn	1	27	0
Mercury	1	21	0
Ketu	0	21	0
Venus	2	0	0
Total	**12**	**0**	**0**

VENUS—Moon

	m	d	h
Moon	1	20	0
Mars	1	5	0
Rahu	3	0	0
Jupiter	2	20	0
Saturn	3	5	0
Mercury	2	25	0
Ketu	1	5	0
Venus	3	10	0
Sun	1	0	0
Total	**20**	**0**	**0**

VENUS—Mars

	m	d	h
Mars	0	24	12
Rahu	2	3	0
Jupiter	1	26	0
Saturn	2	6	12
Mercury	1	29	12
Ketu	0	24	12
Venus	2	10	0
Sun	0	21	0
Moon	1	5	0
Total	**14**	**0**	**0**

VENUS—Rahu

	m	d	h
Rahu	5	12	0
Jupiter	4	24	0
Saturn	5	21	0
Mercury	5	3	0
Ketu	2	3	0
Venus	6	0	0
Sun	1	24	0
Moon	3	0	0
Mars	2	3	0
Total	**36**	**0**	**0**

VENUS—Jupiter

	m	d	h
Jupiter	4	8	0
Saturn	5	2	0
Mercury	4	16	0
Ketu	1	26	0
Venus	5	10	0
Sun	1	18	0
Moon	2	20	0
Mars	1	26	0
Rahu	4	24	0
Total	**32**	**0**	**0**

VENUS—Saturn

	m	d	h
Saturn	6	0	12
Mercury	5	11	12
Ketu	2	6	12
Venus	6	10	0
Sun	1	27	0
Moon	3	5	0
Mars	2	6	12
Rahu	5	21	0
Jupiter	5	2	0
Total	**38**	**0**	**0**

VENUS—Mercury

	m	d	h
Mercury	4	24	12
Ketu	1	29	12
Venus	5	20	0
Sun	1	21	0
Moon	2	25	0
Mars	1	29	12
Rahu	5	3	0
Jupiter	4	16	0
Saturn	5	11	12
Total	**34**	**0**	**0**

VENUS—Ketu

	m	d	h
Ketu	0	24	12
Venus	2	10	0
Sun	0	21	0
Moon	1	5	0
Mars	0	24	12
Rahu	2	3	0
Jupiter	1	26	0
Saturn	2	6	12
Mercury	1	29	12
Total	**14**	**0**	**0**

Ascensional Differences (*Chara*)

The following table gives the ascensional differences for different latitudes of place, and different declinations of planets and equational stars. These ascensional differences given in minutes of time are required in calculating the timings of daily rising and setting of the heavenly bodies at the given locality

Dec. (δ)	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°
Lat. (ϕ)	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
1°	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.1
2	0.1	0.3	0.4	0.5	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.1
4	0.3	0.5	0.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3
6	0.4	0.9	1.3	1.7	2.1	2.5	3.0	3.4	3.8	4.2	4.7	5.1	5.6	6.0	6.5
8	0.6	1.1	1.7	2.2	2.8	3.4	4.0	4.5	5.1	5.7	6.3	6.8	7.4	8.0	8.6
9	0.6	1.3	1.9	2.5	3.2	3.8	4.5	5.1	5.7	6.4	7.1	7.7	8.4	9.0	9.7
10	0.7	1.4	2.1	2.8	3.5	4.2	5.0	5.7	6.4	7.1	7.8	8.6	9.3	10.1	10.8
11	0.8	1.5	2.3	3.1	3.9	4.7	5.5	6.3	7.1	7.8	8.7	9.4	10.3	11.1	11.9
12	0.9	1.7	2.5	3.4	4.3	5.1	6.0	6.8	7.6	8.6	9.5	10.3	11.3	12.1	13.1
13	0.9	1.8	2.8	3.7	4.6	5.6	6.5	7.4	8.4	9.3	10.3	11.2	12.2	13.2	14.2
14	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.1	10.1	11.1	12.1	13.2	14.2	15.3
15	1.1	2.1	3.2	4.3	5.4	6.4	7.5	8.6	9.7	10.8	12.0	13.1	14.2	15.3	16.5
16	1.1	2.3	3.5	4.6	5.7	6.9	8.1	9.2	10.4	11.6	12.8	14.0	15.2	16.4	17.6
17	1.2	2.4	3.7	4.9	6.1	7.3	8.6	9.8	11.1	12.4	13.6	14.9	16.2	17.5	18.8
18	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.5	11.8	13.1	14.5	15.8	17.2	18.6	20.0
19	1.4	2.7	4.1	5.6	6.9	8.3	9.7	11.1	12.5	13.9	15.4	16.8	18.2	19.7	21.2
20	1.5	2.9	4.4	5.8	7.3	8.8	10.3	11.7	13.2	14.7	16.2	17.7	19.3	20.8	22.4
21	1.5	3.1	4.6	6.1	7.7	9.2	10.8	12.4	13.9	15.5	17.1	18.7	20.3	22.0	23.6
22	1.6	3.2	4.8	6.5	8.1	9.7	11.4	13.0	14.7	16.3	18.0	19.7	21.4	23.1	24.9
23	1.7	3.4	5.1	6.8	8.5	10.2	12.0	13.7	15.4	17.2	18.9	20.7	22.5	24.3	26.1
24	1.8	3.6	5.4	7.1	8.9	10.7	12.5	14.3	16.2	18.0	19.9	21.7	23.6	25.5	27.4
25	1.9	3.7	5.6	7.5	9.4	11.2	13.1	15.0	17.0	18.9	20.8	22.7	24.7	26.7	28.7
26	1.9	3.9	5.9	7.8	9.8	11.7	13.7	15.7	17.7	19.7	21.8	23.8	25.8	27.9	30.0
27	2.0	4.1	6.1	8.2	10.2	12.3	14.4	16.8	18.5	20.6	22.7	24.9	27.0	29.2	31.4
28	2.1	4.3	6.4	8.5	10.7	12.8	15.0	17.1	19.3	21.5	23.7	25.9	28.2	30.5	32.8
29	2.2	4.4	6.7	8.9	11.1	13.4	15.6	17.9	20.1	22.4	24.7	27.1	29.4	31.8	34.2
30	2.3	4.6	6.9	9.3	11.6	13.9	16.4	18.6	21.0	23.4	25.8	28.2	30.6	33.1	35.6
31	2.4	4.8	7.2	9.6	12.1	14.5	16.9	19.4	21.9	24.3	26.8	29.3	31.9	34.5	37.1
33	2.6	5.2	7.8	10.4	13.0	15.6	18.3	20.9	24.0	26.3	29.0	31.7	34.5	37.3	40.1
35	2.8	5.6	8.4	11.2	14.1	16.9	19.7	22.6	25.5	28.4	31.3	34.2	37.2	40.2	43.3
Trivandrum (8°31')	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.1	6.7	7.3	7.9	8.6	9.2
Chennai (13°4')	0.9	1.8	2.8	3.7	4.7	5.6	6.5	7.5	8.4	9.4	10.4	11.3	12.3	13.3	14.3
Hyderabad (17°26')	1.2	2.5	3.8	5.1	6.3	7.6	8.8	10.1	11.4	12.7	14.0	15.3	16.6	17.9	19.3
Mumbai (18°58')	1.4	2.7	4.1	5.5	6.9	8.3	9.7	11.1	12.5	13.9	15.3	16.7	18.2	19.7	21.1
Calcutta (22°35')	1.7	3.3	5.0	6.7	8.3	10.0	11.7	13.4	15.1	16.8	18.6	20.3	22.0	23.8	25.6
Ujjain (23°11')	1.7	3.4	5.1	6.9	8.6	10.3	12.1	13.8	16.3	17.3	19.1	20.9	22.7	24.5	26.4
Delhi (28°39')	2.2	4.4	6.6	8.7	11.0	13.2	15.4	17.6	19.8	22.1	24.4	26.7	29.0	31.3	33.7
Chandigarh (30°44')	2.4	4.8	7.1	9.5	11.9	14.3	16.7	19.2	21.6	24.1	26.5	29.0	31.6	34.1	36.7

Rule : To obtain the rising and setting times of the Sun, Moon etc., *firstly* find the time of its meridian passage. In case of Sun the apparent noon is the Meridian Passage time. In case of Moon the tabulated M. Pass. time is required to be interpolated to the approximate time of its rising or setting by subtraction or addition of about 12 minutes. A star passes the meridian when the sidereal time of the moment becomes equal to the Right Ascension of the star. Then find the semi-diurnal Arc which is as follows :—

Semi-diur. Arc = 6h ± Asc. diff. [*positive* sign is to be taken when the declination is North, and *negative* sign when the declination is South].

Local mean time of rising = M. Pass. – Semi-diur. Arc.

Local mean time of setting = M. Pass. + Semi-diur. Arc.

N. B. If the latitude of place is South reverse the *sign* of declination and work.

Ascensional Differences *(Chara)*

The following table gives the ascensional differences for different latitudes of place, and different declinations of planets and equational stars. These ascensional differences given in minutes of time are required in calculating the timings of daily rising and setting of the heavenly bodies at the given locality

Dec. (δ)	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°
Lat. (φ)	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
1°	1.1	1.2	1.3	1.4	1.5	1.6	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.3
2	2.3	2.4	2.6	2.7	2.9	3.1	3.2	3.4	3.6	3.7	3.9	4.1	4.3	4.4	4.6
4	4.6	4.9	5.2	5.5	5.8	6.2	6.5	6.8	7.1	7.5	7.8	8.2	8.5	8.9	9.3
6	6.9	7.4	7.8	8.3	8.8	9.3	9.7	10.3	10.7	11.2	11.7	11.3	12.8	13.4	13.9
8	9.2	9.9	10.5	11.1	11.7	12.4	13.0	13:7	14.3	15.0	15.7	16.4	17.1	17.9	18.6
9	10.4	11.1	11.8	12.5	13.2	13.9	14.7	15.4	16.2	16.9	17.7	18.5	19.3	20.1	21.0
10	11.6	12.4	13.1	13.9	14.7	15.6	16.3	17.2	18.0	18.9	19.7	20.6	21.5	22.4	23.4
11	12.8	13.6	14.5	15.4	16.2	17.1	18.0	18.9	19.9	20.8	21.8	22.7	23.7	24.7	25.8
12	14.0	14.9	15.8	16.8	17.7	18.7	19.7	20.7	21.7	22.7	23.8	24.9	25.9	27.1	28.2
13	15.2	16.2	17.2	18.2	19.3	20.3	21.4	22.5	23.6	24.7	25.9	27.0	28.2	29.4	30.6
14	16.4	17.5	18.6	19.7	20.8	21.9	23.1	24.3	25.5	26.7	27.9	29.2	30.5	31.8	33.1
15	17.6	18.8	20.0	21.2	22.4	23.6	24.9	26.1	27.4	28.7	30.0	31.4	32.8	34.2	35.6
16	18.9	20.1	21.4	22.7	24.0	25.3	26.6	28.0	29.3	30.7	32.1	33.6	25.1	36.6	38.1
17	20.1	21.4	22.8	24.2	25.5	27.0	28.4	29.8	31.3	32.8	34.3	35.8	37.4	39.0	40.7
18	21.4	22.8	24.2	25.7	27.2	28.7	30.2	31.7	33.3	34.9	36.5	38.1	39.8	41.5	43.2
19	22.7	24.2	25.7	27.2	28.8	30.4	32.0	33.6	35.3	37.0	38.7	40.4	42.2	44.0	45.9
20	24.0	25.5	27.2	28.8	30.4	32.1	33.8	35.5	37.3	39.1	40.9	42.7	44.6	46.6	48.5
21	25.3	27.0	28.7	30.4	32.1	33.9	35.7	37.5	39.4	41.2	43.2	45.1	47.1	49.1	51.2
22	26.6	28.4	30.2	32.0	33.8	35.7	37.6	39.5	41.4	43.4	45.5	47.5	49.6	51.8	53.9
23	28.0	29.8	31.7	33.6	35.5	37.5	39.5	41.5	43.6	45.7	47.8	50.0	52.2	54.4	56.7
24	29.3	31.3	33.3	35.3	37.3	39.4	41.4	43.6	45.7	47.9	50.2	52.5	54.8	57.1	59.6
25	30.7	32.8	34.8	36.9	39.1	41.3	43.4	45.7	47.9	50.3	52.6	55.0	57.4	59.9	62.5
26	32.1	34.3	36.5	38.7	40.9	43.2	45.5	47.8	50.2	52.6	55.0	57.6	60.1	62.7	65.4
27	33.6	35.9	38.1	40.4	42.7	45.1	47.5	50.0	52.4	55.0	57.5	60.2	62.9	65.6	68.4
28	35.1	37.4	39.8	42.2	44.9	47.1	49.6	52.2	54.8	57.4	60.1	62.9	65.7	68.6	71.5
29	36.6	39.0	41.5	44.1	46.5	49.1	51.8	54.5	57.1	59.7	62.7	65.6	68.6	71.6	74.7
30	38.1	40.7	43.2	45.9	48.5	51.2	53.9	56.7	59.6	62.5	65.4	68.4	71.5	74.7	77.9
31	39.7	42.3	45.0	47.8	50.5	53.3	56.2	59.1	62.1	65.1	68.2	71.3	74.5	77.8	81.2
33	42.9	45.8	48.7	51.7	54.7	57.7	60.8	64.0	67.2	70.5	73.8	77.3	80.8	84.4	88.1
35	46.3	49.4	52.6	55.8	52.6	62.1	59.1	69.1	72.1	76.2	79.9	83.6	87.4	91.4	95.4
Trivandrum(8°31')	9.8	10.5	11.2	11.8	12.5	13.2	13.9	14.6	15.3	16.0	16.7	17.5	18.3	19.1	19.9
Chennai (13°4')	15.3	16.3	17.3	18.3	19.4	20.4	21.5	22.6	23.7	24.7	26.0	27.2	28.3	29.6	30.8
Hyderabad (17°26')	20.7	22.0	23.4	24.8	26.3	27.0	29.1	30.6	32.1	33.7	35.2	36.1	38.4	40.1	41.1
Mumbai (18°58')	22.6	24.1	25.6	27.2	28.7	30.3	31.9	33.6	35.2	36.9	38.6	40.3	42.1	43.9	45.8
Calcutta (22°35')	27.4	29.2	31.1	32.9	34.8	36.7	38.7	40.7	42.7	44.7	46.8	48.9	51.1	53.3	55.6
Ujjain (23°11')	28.2	30.1	32.0	33.9	35.9	37.8	39.8	41.9	43.0	46.1	48.2	50.4	52.6	54.9	57.3
Delhi (28°39')	36.1	38.5	40.9	43.4	45.9	48.4	51.0	53.6	56.3	59.1	61.8	64.7	67.6	70.5	73.6
Chandigarh (30°44')	39.3	41.9	44.5	47.3	50.0	52.8	55.0	58.5	61.4	63.4	67.4	70.5	73.7	77.0	80.3

Rule : To obtain the rising and setting times of the Sun, Moon etc., *firstly* find the time of its meridian passage. In case of Sun the apparent noon is the Meridian Passage time. In case of Moon the tabulated M. Pass. time is required to be interpolated to the approximate time of its rising or setting by subtraction or addition of about 12 minutes. A star passes the meridian when the sidereal time of the moment becomes equal to the Right Ascension of the star. Then find the semi-diurnal Arc which is as follows :—

Semi-diur. Arc = 6h ± Asc. diff. [*positive* sign is to be taken when the declination is North, and *negative* sign when the declination is South].

Local mean time of rising = M. Pass. – Semi-diur. Arc.

Local mean time of setting = M. Pass. + Semi-duir. Arc.

N. B. If the latitude of place is South reverse the *sign* of declination and work.

Sunrise and Sunset (*upper limb*) for certain places in 1999

(Indian Standard Time)

Date	Colombo 6°N 56′ L.M.T. Corr.–10m.5				Thiruvananthapuram 8°N 32′ L.M.T. Corr.–22m.0				Port Blair 11°N 40′ L.M.T. Corr.–41m.1				Bangalore 12°N 58′ L.M.T. Corr.–19m.6				Chennai 13°N 04′ L.M.T. Corr.–9m.0				Vijayawada 16°N 32′ L.M.T. Corr.–7m.6			
	Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set	
	h	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*
Jan. 0	6	21	18	05	6	36	18	14	5	38	17	05	6	41	18	04	6	31	17	53	6	36	17	45
4	6	23	18	07	6	38	18	16	5	40	17	07	6	43	18	06	6	33	17	55	6	37	17	47
8	6	25	18	09	6	39	18	18	5	41	17	10	6	44	18	08	6	34	17	57	6	38	17	50
12	6	27	18	11	6	40	18	20	5	42	17	12	6	45	18	10	6	35	18	00	6	39	17	52
16	6	27	18	13	6	41	18	22	5	43	17	14	6	46	18	13	6	36	18	02	6	40	17	55
20	6	28	18	15	6	42	18	24	5	44	17	16	6	46	18	15	6	36	18	04	6	40	17	57
24	6	29	18	17	6	43	18	26	5	44	17	18	6	47	18	17	6	36	18	06	6	40	17	59
28	6	29	18	17	6	43	18	27	5	44	17	20	6	47	18	19	6	36	18	08	6	39	18	02
Feb. 1	6	29	18	19	6	43	18	28	5	44	17	21	6	46	18	20	6	36	18	10	6	39	18	04
5	6	29	18	20	6	43	18	30	5	43	17	23	6	45	18	22	6	35	18	11	6	38	18	06
9	6	28	18	21	6	42	18	31	5	42	17	24	6	44	18	23	6	34	18	13	6	36	18	07
13	6	28	18	22	6	41	18	31	5	41	17	25	6	43	18	25	6	33	18	14	6	35	18	09
17	6	27	18	22	6	40	18	32	5	40	17	26	6	42	18	26	6	31	18	15	6	33	18	11
21	6	26	18	23	6	39	18	33	5	38	17	27	6	40	18	27	6	30	18	16	6	31	18	12
25	6	25	18	22	6	38	18	33	5	37	17	28	6	38	18	28	6	28	18	17	6	29	18	13
Mar. 1	6	24	18	22	6	36	18	33	5	35	17	28	6	36	18	28	6	26	18	18	6	26	18	14
5	6	22	18	22	6	34	18	33	5	32	17	29	6	34	18	29	6	23	18	18	6	23	18	15
9	6	20	18	22	6	32	18	33	5	30	17	29	6	31	18	29	6	21	18	19	6	20	18	16
13	6	19	18	22	6	30	18	33	5	28	17	29	6	29	18	30	6	18	18	19	6	18	18	17
17	6	17	18	22	6	29	18	33	5	26	17	29	6	26	18	30	6	16	18	19	6	15	18	18
21	6	15	18	22	6	26	18	33	5	23	17	30	6	24	18	30	6	13	18	20	6	12	18	18
25	6	13	18	21	6	24	18	32	5	21	17	30	6	21	18	31	6	10	18	20	6	09	18	19
29	6	11	18	20	6	22	18	32	5	18	17	30	6	18	18	31	6	07	18	20	6	05	18	20
Apr. 2	6	09	18	20	6	20	18	32	5	16	17	30	6	16	18	31	6	05	18	21	6	02	18	20
6	6	07	18	20	6	18	18	32	5	13	17	30	6	13	18	31	6	03	18	21	5	59	18	21
10	6	05	18	19	6	16	18	31	5	11	17	30	6	11	18	32	6	00	18	21	5	56	18	22
14	6	04	18	19	6	14	18	31	5	08	17	30	6	08	18	32	5	58	18	21	5	54	18	23
18	6	02	18	19	6	12	18	31	5	06	17	31	6	06	18	32	5	55	18	22	5	51	18	23
22	6	00	18	19	6	10	18	31	5	04	17	31	6	04	18	33	5	53	18	22	5	48	18	24
26	5	59	18	18	6	08	18	31	5	02	17	31	6	02	18	33	5	51	18	23	5	46	18	25
30	5	58	18	19	6	07	18	32	5	01	17	32	6	00	18	34	5	49	18	24	5	44	18	26
May 4	5	57	18	19	6	06	18	32	4	59	17	33	5	58	18	35	5	47	18	24	5	42	18	27
8	5	56	18	19	6	05	18	32	4	58	17	33	5	57	18	36	5	46	18	25	5	40	18	28
12	5	55	18	19	6	04	18	33	4	56	17	34	5	55	18	37	5	45	18	26	5	38	18	30
16	5	54	18	20	6	03	18	34	4	56	17	35	5	54	18	38	5	44	18	27	5	37	18	31
20	5	53	18	20	6	03	18	34	4	55	17	36	5	54	18	39	5	43	18	28	5	36	18	32
24	5	54	18	22	6	02	18	35	4	54	17	37	5	53	18	40	5	42	18	30	5	35	18	34
28	5	54	18	22	6	02	18	36	4	54	17	38	5	53	18	41	5	42	18	31	5	35	18	35
June 1	5	54	18	23	6	02	18	37	4	54	17	39	5	52	18	42	5	42	18	32	5	34	18	37
5	5	55	18	24	6	03	18	38	4	54	17	41	5	53	18	43	5	42	18	33	5	34	18	38
9	5	54	18	25	6	03	18	39	4	55	17	42	5	53	18	45	5	42	18	34	5	34	18	39
13	5	56	18	26	6	04	18	40	4	55	17	43	5	53	18	46	5	43	18	35	5	35	18	40
17	5	57	18	27	6	04	18	41	4	56	17	44	5	54	18	47	5	43	18	36	5	35	18	42
21	5	57	18	28	6	05	18	42	4	57	17	45	5	55	18	48	5	44	18	37	5	36	18	42
25	5	58	18	29	6	06	18	43	4	57	17	46	5	56	18	49	5	45	18	38	5	37	18	43
29	5	59	18	29	6	07	18	44	4	58	17	46	5	57	18	49	5	46	18	39	5	38	18	44
July 3	5	58	18	30	6	08	18	44	4	59	17	47	5	58	18	50	5	47	18	39	5	39	18	44

N.B.—To obtain the times of Sunrise and Sunset in L. M. T. of the place, apply the correction for L. M. T. as indicated above for each station.

Sunrise and Sunset (*upper limb*) for certain places in 1999

(Indian Standard Time)

Date	Colombo 6°N 56′ L.M.T. Corr. $-10^{m}.5$				Thiruvan-anthapuram 8°N 32′ L.M.T. Corr. $-22^{m}.0$				Port Blair 11°N 40′ L.M.T. Corr. $-41^{m}.1$				Bangalore 12°N 58′ L.M.T. Corr. $-19^{m}.6$				Chennai 13°N 04′ L.M.T. Corr. $-9^{m}.0$				Vijayawada 16°N 32′ L.M.T. Corr. $-7^{m}.6$			
	Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set	
	h	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*
July 3	5	58	18	30	6	08	18	44	4	59	17	47	5	58	18	50	5	47	18	39	5	39	18	44
7	6	00	18	30	6	09	18	45	5	00	17	47	5	59	18	50	5	48	18	40	5	40	18	44
11	6	02	18	31	6	10	18	45	5	02	17	47	6	00	18	50	5	49	18	40	5	42	18	44
15	6	03	18	32	6	11	18	45	5	03	17	47	6	01	18	50	5	50	18	39	5	43	18	44
19	6	03	18	31	6	12	18	45	5	04	17	47	6	02	18	49	5	51	18	39	5	44	18	43
23	6	05	18	31	6	12	18	44	5	05	17	46	6	03	18	49	5	53	18	38	5	46	18	43
27	6	05	18	30	6	13	18	44	5	05	17	45	6	04	18	48	5	53	18	38	5	47	18	41
31	6	05	18	29	6	14	18	43	5	06	17	44	6	05	18	47	5	54	18	36	5	48	18	40
Aug. 4	6	05	18	28	6	14	18	42	5	07	17	43	6	06	18	45	5	55	18	35	5	49	18	38
8	6	05	18	27	6	14	18	41	5	07	17	42	6	07	18	44	5	56	18	33	5	50	18	36
12	6	05	18	26	6	15	18	39	5	08	17	40	6	07	18	42	5	56	18	32	5	51	18	34
16	6	05	18	25	6	15	18	38	5	08	17	38	6	08	18	40	5	57	18	30	5	52	18	32
20	6	05	18	23	6	15	18	36	5	09	17	36	6	08	18	38	5	57	18	29	5	53	18	29
24	6	05	18	22	6	14	18	34	5	09	17	34	6	08	18	36	5	58	18	26	5	53	18	27
28	6	04	18	20	6	14	18	32	5	09	17	32	6	09	18	33	5	58	18	24	5	54	18	24
Sept. 1	6	04	18	18	6	14	18	30	5	09	17	29	6	09	18	31	5	58	18	20	5	54	18	21
5	6	03	18	16	6	14	18	28	5	09	17	27	6	09	18	28	5	58	18	17	5	55	18	18
9	6	03	18	14	6	13	18	26	5	09	17	24	6	09	18	25	5	58	18	15	5	55	18	15
13	6	02	18	12	6	13	18	23	5	09	17	21	6	09	18	22	5	58	18	12	5	56	18	11
17	6	01	18	09	6	12	18	21	5	08	17	19	6	09	18	19	5	58	18	09	5	56	18	08
21	6	00	18	07	6	12	18	19	5	08	17	16	6	09	18	17	5	58	18	06	5	57	18	05
25	6	00	18	04	6	11	18	16	5	08	17	13	6	09	18	14	5	58	18	03	5	57	18	02
29	5	58	18	04	6	11	18	14	5	08	17	10	6	09	18	11	5	58	18	00	5	58	17	58
Oct. 3	5	58	18	01	6	10	18	12	5	08	17	08	6	09	18	08	5	59	17	58	5	58	17	55
7	5	58	17	59	6	10	18	10	5	08	17	05	6	09	18	06	5	59	17	55	5	59	17	52
11	5	57	17	58	6	10	18	08	5	08	17	03	6	10	18	03	5	59	17	53	5	59	17	49
15	5	58	17	56	6	10	18	06	5	09	17	01	6	10	18	01	6	00	17	50	6	00	17	47
19	5	57	17	55	6	10	18	04	5	09	16	59	6	11	17	59	6	00	17	48	6	01	17	44
23	5	58	17	53	6	10	18	03	5	10	16	57	6	11	17	57	6	01	17	46	6	02	17	42
27	5	57	17	52	6	10	18	01	5	10	16	55	6	12	17	55	6	02	17	44	6	03	17	39
31	5	57	17	51	6	11	18	00	5	11	16	54	6	13	17	53	6	03	17	43	6	05	17	37
Nov. 4	5	58	17	51	6	12	17	59	5	12	16	53	6	14	17	52	6	04	17	41	6	06	17	36
8	5	58	17	50	6	13	17	59	5	13	16	52	6	16	17	51	6	05	17	40	6	08	17	34
12	5	59	17	50	6	14	17	58	5	15	16	51	6	17	17	50	6	07	17	40	6	10	17	33
16	6	01	17	50	6	15	17	58	5	16	16	51	6	19	17	50	6	08	17	39	6	12	17	33
20	6	02	17	51	6	16	17	59	5	18	16	51	6	20	17	50	6	10	17	39	6	14	17	32
24	6	03	17	51	6	18	17	59	5	20	16	51	6	22	17	50	6	12	17	39	6	16	17	32
28	6	05	17	51	6	20	18	00	5	22	16	52	6	24	17	50	6	14	17	40	6	18	17	32
Dec. 2	6	06	17	52	6	22	18	01	5	24	16	53	6	27	17	51	6	16	17	40	6	21	17	33
6	6	09	17	54	6	24	18	02	5	26	16	54	6	29	17	52	6	18	17	41	6	23	17	34
10	6	10	17	56	6	26	18	04	5	28	16	55	6	31	17	53	6	21	17	43	6	25	17	35
14	6	13	17	57	6	28	18	05	5	30	16	57	6	33	17	55	6	23	17	44	6	27	17	37
18	6	15	17	59	6	30	18	07	5	32	16	58	6	35	17	57	6	25	17	46	6	30	17	38
22	6	17	18	01	6	32	18	09	5	34	17	00	6	37	17	59	6	27	17	48	6	32	17	40
26	6	19	18	03	6	34	18	11	5	36	17	02	6	39	18	01	6	29	17	50	6	34	17	42
30	6	20	18	05	6	35	18	13	5	38	17	05	6	41	18	03	6	31	17	52	6	35	17	44
Jan. 3	6	22	18	07	6	37	18	15	5	40	17	07	6	43	18	05	6	32	17	54	6	37	17	47

N.B.—To obtain the times of Sunrise and Sunset for the centre of the Sun, apply correction of + 3.5*m* for Rise and –3.5*m* for Set.

Sunrise and Sunset (*upper limb*) for certain places in 1999

(Indian Standard Time)

Date	Hyderabad 17°N 26′ L.M.T. Corr. $+16^{m}.2$				Mumbai 18°N 58′ L.M.T. Corr. $-38^{m}.7$				Puri 19°N 48′ L.M.T. Corr. $+13^{m}.3$				Nagpur 21°N 09′ L.M.T. Corr. $-13^{m}.7$				Ahmedabad 23°N 02′ L.M.T. Corr. $-39^{m}.6$				Bhopal 23°N 16′ L.M.T. Corr. $-20^{m}.3$			
	Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set	
	h	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*
Jan. 0	6	46	17	52	7	12	18	12	6	21	17	18	6	51	17	42	7	21	18	05	7	02	17	45
4	6	48	17	54	7	13	18	14	6	22	17	21	6	52	17	45	7	22	18	07	7	03	17	47
8	6	49	17	57	7	14	18	17	6	23	17	23	6	53	17	47	7	23	18	13	7	04	17	50
12	6	49	17	59	7	15	18	19	6	24	17	26	6	53	17	50	7	23	18	16	7	04	17	53
16	6	50	18	02	7	15	18	22	6	24	17	28	6	53	17	53	7	23	18	18	7	04	17	56
20	6	50	18	04	7	15	18	24	6	24	17	31	6	53	17	55	7	22	18	21	7	04	17	59
24	6	50	18	07	7	15	18	27	6	24	17	33	6	53	17	58	7	21	18	24	7	03	18	02
28	6	50	18	07	7	14	18	29	6	23	17	36	6	52	18	01	7	21	18	24	7	02	18	04
Feb. 1	6	49	18	11	7	13	18	32	6	22	17	38	6	51	18	03	7	20	18	27	7	01	18	07
5	6	47	18	13	7	12	18	34	6	21	17	41	6	49	18	06	7	18	18	29	6	59	18	10
9	6	46	18	15	7	10	18	36	6	19	17	43	6	48	18	08	7	16	18	32	6	57	18	12
13	6	44	18	17	7	08	18	38	6	17	17	45	6	45	18	10	7	14	18	34	6	55	18	15
17	6	42	18	18	7	06	18	39	6	15	17	47	6	43	18	12	7	11	18	36	6	52	18	17
21	6	40	18	20	7	04	18	41	6	13	17	48	6	40	18	14	7	08	18	39	6	49	18	19
25	6	38	18	21	7	01	18	43	6	10	17	50	6	38	18	16	7	05	18	41	6	46	18	21
Mar. 1	6	35	18	22	6	59	18	44	6	07	17	51	6	35	18	17	7	02	18	43	6	43	18	23
5	6	32	18	23	6	56	18	45	6	04	17	53	6	31	18	19	6	58	18	44	6	39	18	25
9	6	29	18	24	6	52	18	46	6	01	17	54	6	28	18	20	6	55	18	46	6	36	18	27
13	6	26	18	25	6	49	18	48	5	57	17	55	6	24	18	22	6	51	18	48	6	32	18	28
17	6	23	18	26	6	46	18	49	5	54	17	56	6	21	18	23	6	47	18	49	6	28	18	30
21	6	20	18	27	6	43	18	50	5	51	17	58	6	17	18	24	6	43	18	51	6	24	18	31
25	6	17	18	28	6	39	18	51	5	47	17	59	6	14	18	26	6	40	18	52	6	20	18	33
29	6	14	18	29	6	36	18	52	5	44	18	00	6	10	18	27	6	36	18	54	6	16	18	34
Apr. 2	6	11	18	29	6	33	18	52	5	40	18	01	6	06	18	28	6	32	18	55	6	12	18	36
6	6	08	18	30	6	29	18	53	5	37	18	02	6	03	18	29	6	28	18	57	6	09	18	37
10	6	04	18	31	6	26	18	54	5	33	18	03	5	59	18	31	6	24	18	58	6	05	18	39
14	6	02	18	32	6	23	18	55	5	30	18	04	5	56	18	32	6	21	19	00	6	01	18	41
18	5	59	18	33	6	20	18	57	5	27	18	05	5	53	18	33	6	17	19	01	5	58	18	42
22	5	56	18	34	6	17	18	58	5	24	18	07	5	50	18	35	6	14	19	03	5	54	18	44
26	5	54	18	35	6	14	18	59	5	21	18	08	5	47	18	36	6	11	19	04	5	51	18	45
30	5	51	18	36	6	12	19	00	5	19	18	09	5	44	18	38	6	08	19	06	5	48	18	47
May 4	5	49	18	37	6	10	19	02	5	17	18	11	5	42	18	38	6	05	19	08	5	46	18	49
8	5	47	18	38	6	08	19	03	5	14	18	12	5	39	18	41	6	03	19	10	5	43	18	51
12	5	46	18	40	6	06	19	04	5	13	18	14	5	37	18	42	6	01	19	12	5	41	18	53
16	5	44	18	41	6	04	19	06	5	11	18	15	5	36	18	44	5	59	19	13	5	39	18	55
20	5	43	18	42	6	03	19	08	5	10	18	17	5	34	18	46	5	57	19	15	5	37	18	57
24	5	42	18	44	6	02	19	09	5	09	18	18	5	33	18	48	5	56	19	17	5	36	18	58
28	5	42	18	45	6	01	19	11	5	08	18	20	5	32	18	49	5	55	19	19	5	35	19	00
June 1	5	41	18	47	6	01	19	12	5	07	18	22	5	31	18	51	5	54	19	21	5	34	19	02
5	5	41	18	48	6	01	19	14	5	07	18	23	5	31	18	53	5	54	19	22	5	34	19	04
9	5	41	18	50	6	01	19	15	5	07	18	25	5	31	18	54	5	54	19	24	5	34	19	05
13	5	42	18	51	6	01	19	16	5	07	18	26	5	31	18	55	5	54	19	25	5	34	19	07
17	5	42	18	52	6	02	19	17	5	08	18	27	5	32	18	56	5	54	19	27	5	34	19	08
21	5	43	18	53	6	02	19	18	5	09	18	28	5	33	18	57	5	55	19	28	5	35	19	09
25	5	44	18	54	6	03	19	19	5	10	18	29	5	34	18	58	5	56	19	28	5	36	19	10
29	5	45	18	54	6	04	19	20	5	11	18	29	5	35	18	59	5	57	19	29	5	37	19	10
July 3	5	46	18	55	6	06	19	20	5	12	18	30	5	36	18	59	5	58	19	29	5	39	19	10

N.B.—To obtain the times of Sunrise and Sunset in L.M.T. apply the correction for L.M.T. as indicated above for each station.

Sunrise and Sunset *(upper limb)* for certain places in 1999

(Indian Standard Time)

Date	Hyderabad 17°N 26′ L.M.T. Corr. $+16^m.2$		Mumbai 18°N 58′ L.M.T. Corr. $-38^m.7$		Puri 19°N 48′ L.M.T. Corr. $+13^m.3$		Nagpur 21°N 09′ L.M.T. Corr. $-13^m.7$		Ahmedabad 23°N 02′ L.M.T. Corr. $-39^m.6$		Bhopal 23°N 16′ L.M.T. Corr. $-20^m.3$	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*
July 3	5 46	18 55	6 06	19 20	5 12	18 30	5 36	18 59	5 58	19 29	5 39	19 10
7	5 47	18 55	6 07	19 20	5 13	18 30	5 37	18 59	6 00	19 29	5 40	19 10
11	5 49	18 54	6 08	19 20	5 15	18 29	5 39	18 59	6 01	19 29	5 42	19 10
15	5 50	18 54	6 10	19 19	5 16	18 29	5 40	18 58	6 03	19 28	5 43	19 09
19	5 51	18 53	6 11	19 19	5 18	18 28	5 42	18 57	6 05	19 27	5 45	19 08
23	5 53	18 52	6 13	19 18	5 19	18 27	5 44	18 56	6 06	19 25	5 47	19 07
27	5 54	18 51	6 14	19 16	5 21	18 26	5 45	18 54	6 08	19 24	5 49	19 05
31	5 55	18 50	6 15	19 15	5 22	18 24	5 47	18 53	6 10	19 22	5 50	19 03
Aug. 4	5 56	18 48	6 17	19 13	5 23	18 22	5 48	18 51	6 12	19 20	5 52	19 01
8	5 57	18 46	6 18	19 11	5 25	18 20	5 50	18 48	6 13	19 17	5 54	18 58
12	5 58	18 44	6 19	19 08	5 26	18 17	5 51	18 46	6 15	19 14	5 55	18 55
16	5 59	18 41	6 20	19 06	5 27	18 15	5 52	18 43	6 15	19 11	5 57	18 52
20	6 00	18 39	6 21	19 03	5 28	18 12	5 54	18 40	6 18	19 08	5 58	18 49
24	6 01	18 36	6 22	19 00	5 29	18 09	5 55	18 37	6 19	19 05	6 00	18 45
28	6 02	18 33	6 23	18 57	5 30	18 05	5 56	18 33	6 21	19 01	6 01	18 42
Sept. 1	6 02	18 30	6 24	18 54	5 31	18 02	5 57	18 30	6 22	18 57	6 02	18 38
5	6 03	18 27	6 25	18 50	5 32	17 59	5 58	18 26	6 23	18 53	6 04	18 34
9	6 04	18 23	6 25	18 47	5 33	17 55	5 59	18 22	6 24	18 49	6 05	18 30
13	6 04	18 20	6 26	18 43	5 34	17 51	6 00	18 19	6 26	18 45	6 06	18 26
17	6 05	18 17	6 27	18 40	5 35	17 48	6 01	18 15	6 27	18 41	6 07	18 22
21	6 05	18 13	6 28	18 36	5 35	17 44	6 02	18 11	6 28	18 37	6 09	18 18
25	6 06	18 10	6 28	18 34	5 36	17 40	6 03	18 07	6 29	18 33	6 10	18 14
29	6 06	18 07	6 29	18 29	5 37	17 37	6 04	18 03	6 31	18 29	6 11	18 10
Oct. 3	6 07	18 04	6 30	18 26	5 38	17 33	6 05	18 00	6 32	18 25	6 13	18 06
7	6 08	18 00	6 31	18 22	5 39	17 30	6 06	17 56	6 33	18 21	6 14	18 02
11	6 08	17 57	6 32	18 19	5 40	17 27	6 08	17 53	6 35	18 18	6 16	17 58
15	6 09	17 55	6 33	18 16	5 41	17 23	6 09	17 49	6 36	18 14	6 17	17 55
19	6 10	17 52	6 34	18 13	5 43	17 21	6 10	17 46	6 38	18 11	6 19	17 51
23	6 12	17 49	6 35	18 11	5 44	17 18	6 12	17 43	6 40	18 08	6 21	17 48
27	6 13	17 47	6 37	18 08	5 46	17 15	6 14	17 41	6 42	18 05	6 23	17 45
31	6 14	17 45	6 39	18 06	5 47	17 13	6 16	17 38	6 44	18 02	6 25	17 43
Nov. 4	6 16	17 43	6 40	18 04	5 49	17 11	6 18	17 36	6 46	18 00	6 27	17 40
8	6 18	17 42	6 42	18 02	5 51	17 09	6 20	17 34	6 49	17 58	6 30	17 38
12	6 20	17 41	6 44	18 01	5 53	17 08	6 22	17 33	6 51	17 56	6 32	17 37
16	6 22	17 40	6 46	18 00	5 56	17 07	6 24	17 32	6 54	17 55	6 35	17 35
20	6 24	17 39	6 49	18 00	5 58	17 06	6 27	17 31	6 56	17 54	6 37	17 34
24	6 26	17 39	6 51	17 59	6 00	17 06	6 29	17 30	6 59	17 53	6 40	17 34
28	6 28	17 39	6 54	17 59	6 03	17 06	6 32	17 30	7 02	17 53	6 43	17 33
Dec. 2	6 31	17 40	6 56	18 00	6 05	17 06	6 35	17 31	7 04	17 53	6 46	17 33
6	6 33	17 41	6 58	18 01	6 08	17 07	6 37	17 31	7 07	17 54	6 48	17 34
10	6 36	17 42	7 01	18 02	6 10	17 08	6 40	17 32	7 10	17 55	6 51	17 35
14	6 38	17 43	7 03	18 03	6 13	17 09	6 42	17 33	7 12	17 56	6 53	17 36
18	6 40	17 45	7 06	18 05	6 15	17 11	6 44	17 35	7 14	17 57	6 56	17 38
22	6 42	17 47	7 08	18 07	6 17	17 13	6 47	17 37	7 17	17 59	6 58	17 40
26	6 44	17 49	7 09	18 09	6 19	17 15	6 48	17 39	7 18	18 02	7 00	17 42
30	6 46	17 51	7 11	18 11	6 21	17 17	6 50	17 41	7 20	18 04	7 01	17 44
Jan. 3	6 47	17 54	7 13	18 13	6 22	17 20	6 51	17 44	7 21	18 06	7 03	17 47

N.B.—To obtain the times of Sunrise and Sunset of the centre of the Sun, apply the correction of $+ 3.5m$ for Rise and $-3.5m$ for Set.

Sunrise and Sunset *(upper limb)* for certain places in 1999

(Indian Standard Time)

Date	Aijawl 23°N 44′ L.M.T. Corr.+41m.0		Agartala 23°N 49′ L.M.T. Corr.+35m.1		Imphal 24°N 48′ L.M.T. Corr.+45m.8		Varanasi 25°N 19′ L.M.T. Corr.+2m.1		Patna 25°N 36′ L.M.T. Corr.+10m.5		Kohima 25°N 41′ L.M.T. Corr.+46m.5	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Jan. 0	6 01	16 43	6 07	16 48	5 59	16 36	6 44	17 18	6 36	17 10	6 00	16 33
4	6 02	16 45	6 09	16 51	6 00	16 38	6 45	17 21	6 37	17 12	6 01	16 36
8	6 03	16 48	6 09	16 54	6 01	16 41	6 45	17 24	6 37	17 15	6 02	16 39
12	6 04	16 51	6 10	16 57	6 01	16 44	6 46	17 27	6 38	17 18	6 02	16 42
16	6 04	16 54	6 10	16 59	6 01	16 47	6 46	17 30	6 38	17 21	6 02	16 45
20	6 03	16 57	6 09	17 02	6 00	16 50	6 45	17 33	6 37	17 24	6 01	16 48
24	6 03	17 00	6 09	17 05	6 00	16 53	6 44	17 36	6 36	17 27	6 01	16 51
28	6 02	17 02	6 08	17 08	5 58	16 56	6 43	17 39	6 35	17 30	5 59	16 54
Feb. 1	6 00	17 05	6 06	17 11	5 57	16 59	6 42	17 42	6 33	17 33	5 58	16 57
5	5 58	17 08	6 04	17 14	5 55	17 02	6 40	17 45	6 31	17 36	5 56	17 00
9	5 56	17 10	6 02	17 16	5 53	17 04	6 37	17 47	6 29	17 38	5 53	17 02
13	5 54	17 13	6 00	17 19	5 50	17 07	6 35	17 50	6 26	17 41	5 51	17 05
17	5 51	17 15	5 57	17 21	5 47	17 09	6 32	17 53	6 24	17 44	5 48	17 08
21	5 48	17 17	5 54	17 23	5 44	17 12	6 29	17 55	6 20	17 46	5 44	17 10
25	5 45	17 19	5 51	17 25	5 41	17 14	6 25	17 57	6 17	17 49	5 41	17 13
Mar. 1	5 42	17 21	5 48	17 27	5 38	17 16	6 22	17 59	6 13	17 51	5 37	17 15
5	5 38	17 23	5 44	17 29	5 34	17 18	6 18	18 02	6 10	17 53	5 34	17 17
9	5 34	17 25	5 40	17 31	5 30	17 20	6 14	18 04	6 06	17 55	5 30	17 19
13	5 31	17 27	5 37	17 33	5 26	17 22	6 10	18 05	6 02	17 57	5 26	17 21
17	5 27	17 29	5 33	17 34	5 22	17 24	6 06	18 07	5 57	17 59	5 21	17 23
21	5 23	17 30	5 29	17 36	5 18	17 25	6 02	18 09	5 53	18 01	5 17	17 25
25	5 19	17 33	5 25	17 38	5 14	17 27	5 58	18 11	5 49	18 03	5 13	17 27
29	5 15	17 33	5 21	17 39	5 10	17 29	5 53	18 13	5 45	18 04	5 09	17 28
Apr. 2	5 11	17 35	5 17	17 41	5 06	17 30	5 49	18 14	5 41	18 06	5 05	17 30
6	5 07	17 36	5 13	17 42	5 02	17 32	5 45	18 16	5 37	18 08	5 00	17 32
10	5 03	17 38	5 09	17 44	4 58	17 34	5 41	18 18	5 32	18 10	4 56	17 34
14	5 00	17 40	5 05	17 45	4 54	17 36	5 37	18 20	5 28	18 12	4 52	17 36
18	4 56	17 41	5 02	17 47	4 50	17 37	5 33	18 22	5 25	18 14	4 49	17 38
22	4 53	17 43	4 58	17 49	4 47	17 39	5 30	18 24	5 21	18 15	4 45	17 40
26	4 49	17 45	4 55	17 51	4 43	17 41	5 26	18 26	5 18	18 17	4 42	17 42
30	4 46	17 46	4 52	17 52	4 40	17 43	5 23	18 28	5 14	18 19	4 38	17 44
May 4	4 44	17 48	4 49	17 54	4 37	17 45	5 20	18 30	5 11	18 21	4 35	17 46
8	4 41	17 50	4 47	17 56	4 35	17 47	5 18	18 32	5 09	18 24	4 33	17 48
12	4 39	17 52	4 45	17 58	4 32	17 49	5 15	18 34	5 06	18 26	4 30	17 50
16	4 37	17 54	4 43	18 00	4 30	17 51	5 13	18 36	5 04	18 28	4 28	17 52
20	4 35	17 56	4 41	18 02	4 28	17 53	5 11	18 38	5 02	18 30	4 26	17 54
24	4 34	17 58	4 40	18 04	4 27	17 55	5 10	18 40	5 01	18 32	4 25	17 56
28	4 33	18 00	4 38	18 06	4 26	17 57	5 09	18 42	5 00	18 34	4 23	17 58
June 1	4 32	18 02	4 38	18 08	4 25	17 59	5 08	18 44	4 59	18 36	4 23	18 00
5	4 32	18 03	4 37	18 09	4 25	18 01	5 07	18 46	4 58	18 38	4 22	18 02
9	4 32	18 05	4 37	18 11	4 24	18 02	5 07	18 47	4 58	18 39	4 22	18 04
13	4 32	18 06	4 37	18 12	4 25	18 04	5 07	18 49	4 58	18 41	4 22	18 05
17	4 32	18 07	4 38	18 14	4 25	18 05	5 08	18 50	4 59	18 42	4 22	18 06
21	4 33	18 08	4 39	18 15	4 26	18 06	5 08	18 51	4 59	18 43	4 23	18 07
25	4 34	18 09	4 39	18 15	4 27	18 07	5 09	18 52	5 00	18 44	4 24	18 08
29	4 35	18 10	4 41	18 16	4 28	18 07	5 11	18 52	5 01	18 44	4 25	18 08
July 3	4 36	18 10	4 42	18 16	4 29	18 07	5 12	18 52	5 03	18 44	4 27	18 09

N.B.—To obtain the times of Sunrise and Sunset in L.M.T. apply the correction for L.M.T. as indicated above for each station.

Sunrise and Sunset *(upper limb)* for certain places in 1999

(Indian Standard Time)

Date	Aijawl 23°N 44′ L.M.T. Corr.+41^m.0				Agartala 23°N 49′ L.M.T. Corr.+35^m.1				Imphal 24°N 48′ L.M.T. Corr.+45^m.8				Varanasi 25°N 19′ L.M.T. Corr.+2^m.1				Patna 25°N 36′ L.M.T. Corr.+10^m.5				Kohima 25°N 41′ L.M.T. Corr.+46^m.5			
	Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set	
	h	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*
July 3	4	36	18	10	4	42	18	16	4	29	18	07	5	12	18	52	5	03	18	44	4	27	18	09
7	4	38	18	10	4	43	18	16	4	31	18	07	5	13	18	52	5	04	18	44	4	28	18	08
11	4	39	18	09	4	45	18	15	4	32	18	07	5	15	18	52	5	06	18	44	4	30	18	08
15	4	41	18	09	4	47	18	15	4	34	18	06	5	17	18	51	5	08	18	43	4	32	18	07
19	4	43	18	07	4	49	18	14	4	36	18	05	5	19	18	49	5	10	18	42	4	34	18	06
23	4	45	18	06	4	50	18	12	4	38	18	03	5	21	18	48	5	12	18	40	4	36	18	04
27	4	46	18	04	4	52	18	10	4	40	18	01	5	23	18	46	5	14	18	38	4	37	18	02
31	4	48	18	02	4	54	18	08	4	42	17	59	5	25	18	44	5	16	18	36	4	39	18	00
Aug. 4	4	50	18	00	4	56	18	06	4	43	17	57	5	26	18	41	5	17	18	33	4	41	17	58
8	4	52	17	57	4	57	18	03	4	45	17	54	5	28	18	39	5	19	18	31	4	43	17	55
12	4	53	17	55	4	59	18	01	4	47	17	51	5	30	18	36	5	21	18	27	4	45	17	52
16	4	55	17	53	5	01	17	57	4	49	17	48	5	32	18	32	5	23	18	24	4	47	17	48
20	4	56	17	48	5	02	17	54	4	50	17	44	5	34	18	29	5	25	18	21	4	49	17	45
24	4	58	17	45	5	04	17	51	4	52	17	41	5	35	18	25	5	27	18	17	4	51	17	41
28	4	59	17	41	5	04	17	49	4	54	17	37	5	37	18	21	5	28	18	13	4	52	17	37
Sept. 1	5	01	17	37	5	07	17	43	4	55	17	33	5	39	18	17	5	30	18	09	4	54	17	33
5	5	02	17	33	5	08	17	39	4	57	17	29	5	40	18	13	5	31	18	05	4	55	17	29
9	5	03	17	29	5	09	17	35	4	58	17	25	5	42	18	09	5	33	18	00	4	57	17	25
13	5	05	17	25	5	11	17	31	5	00	17	21	5	43	18	05	5	35	17	56	4	59	17	20
17	5	06	17	21	5	12	17	27	5	01	17	16	5	45	18	00	5	36	17	52	5	00	17	16
21	5	07	17	17	5	13	17	23	5	02	17	12	5	46	17	56	5	38	17	47	5	02	17	11
25	5	09	17	13	5	15	17	18	5	04	17	08	5	48	17	51	5	39	17	43	5	03	17	07
29	5	10	17	08	5	16	17	14	5	05	17	03	5	49	17	47	5	41	17	39	5	05	17	03
Oct. 3	5	11	17	04	5	17	17	10	5	07	16	59	5	51	17	43	5	42	17	34	5	07	16	58
7	5	13	17	01	5	19	17	06	5	09	16	55	5	53	17	39	5	44	17	30	5	08	16	54
11	5	15	16	57	5	20	17	03	5	10	16	51	5	54	17	35	5	46	17	26	5	10	16	50
15	5	16	16	53	5	22	16	59	5	12	16	48	5	56	17	31	5	48	17	22	5	12	16	46
19	5	18	16	50	5	24	16	56	5	14	16	44	5	58	17	27	5	50	17	19	5	14	16	43
23	5	20	16	46	5	26	16	52	5	16	16	41	6	00	17	24	5	52	17	15	5	16	16	39
27	5	22	16	43	5	28	16	49	5	18	16	38	6	03	17	21	5	54	17	12	5	19	16	36
31	5	24	16	41	5	30	16	47	5	21	16	35	6	05	17	18	5	57	17	09	5	21	16	33
Nov. 4	5	27	16	38	5	32	16	44	5	23	16	32	6	08	17	15	5	59	17	06	5	24	16	30
8	5	29	16	36	5	35	16	42	5	26	16	30	6	10	17	13	6	02	17	04	5	26	16	28
12	5	31	16	34	5	37	16	40	5	28	16	28	6	13	17	11	6	05	17	02	5	29	16	26
16	5	34	16	33	5	40	16	39	5	31	16	27	6	16	17	09	6	08	17	00	5	32	16	24
20	5	37	16	32	5	43	16	38	5	34	16	25	6	19	17	08	6	10	16	59	5	35	16	23
24	5	40	16	31	5	46	16	37	5	37	16	25	6	21	17	08	6	13	16	58	5	38	16	22
28	5	42	16	31	5	48	16	37	5	40	16	24	6	24	17	07	6	16	16	59	5	41	16	22
Dec. 2	5	45	16	31	5	51	16	37	5	42	16	24	6	27	17	07	6	19	16	59	5	44	16	22
6	5	48	16	32	5	54	16	37	5	45	16	25	6	30	17	08	6	22	16	58	5	46	16	22
10	5	50	16	33	5	57	16	38	5	48	16	26	6	33	17	08	6	25	16	59	5	49	16	23
14	5	53	16	34	5	59	16	40	5	50	16	27	6	35	17	10	6	27	17	00	5	52	16	24
18	5	55	16	35	6	01	16	41	5	53	16	28	6	38	17	11	6	30	17	02	5	54	16	26
22	5	57	16	37	6	03	16	43	5	55	16	30	6	40	17	13	6	32	17	04	5	56	16	28
26	5	59	16	39	6	05	16	45	5	57	16	32	6	42	17	15	6	34	17	06	5	58	16	30
30	6	01	16	42	6	07	16	48	5	58	16	35	6	43	17	18	6	35	17	08	5	59	16	32
Jan. 3	6	02	16	44	6	08	16	50	5	59	16	37	6	44	17	20	6	36	17	11	6	01	16	35

N.B.—To obtain the times of Sunrise and Sunset for the centre of the Sun, apply correction of + 3.5*m* for Rise and –3.5*m* for Set.

Sunrise and Sunset *(upper limb)* for certain places in 1999

(Indian Standard Time)

Date	Guwahati 26°N 10′ L.M.T. Corr. $+37^{m}.0$				Jaipur 26°N 55′ L.M.T. Corr. $-26^{m}.7$				Delhi 28°N 39′ L.M.T. Corr. $-21^{m}.1$				Chandigarh 30°N 44′ L.M.T. Corr. $-22^{m}.5$				Simla 31°N 06′ L.M.T. Corr. $-21^{m}.3$				Amritasar 31°N 38′ L.M.T. Corr. $-30^{m}.5$			
	Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set	
	h	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*
Jan. 0	6	10	16	42	7	16	17	44	7	14	17	34	7	20	17	31	7	20	17	29	7	30	17	37
4	6	11	16	44	7	17	17	46	7	15	17	37	7	21	17	34	7	21	17	32	7	31	17	40
8	6	12	16	47	7	17	17	49	7	15	17	40	7	21	17	37	7	21	17	35	7	31	17	43
12	6	12	16	50	7	17	17	52	7	16	17	43	7	21	17	40	7	21	17	38	7	31	17	46
16	6	12	16	53	7	17	17	56	7	15	17	47	7	21	17	44	7	21	17	42	7	31	17	50
20	6	12	16	56	7	17	17	59	7	15	17	50	7	20	17	47	7	19	17	45	7	30	17	53
24	6	11	16	59	7	16	18	02	7	13	17	53	7	19	17	51	7	18	17	49	7	28	17	57
28	6	10	17	03	7	14	18	05	7	12	17	57	7	17	17	54	7	16	17	52	7	26	18	01
Feb. 1	6	08	17	06	7	13	18	08	7	09	18	00	7	15	17	58	7	14	17	56	7	24	18	04
5	6	06	17	08	7	11	18	11	7	08	18	03	7	12	18	01	7	11	18	00	7	21	18	08
9	6	03	17	11	7	08	18	14	7	05	18	06	7	09	18	05	7	08	18	03	7	18	18	11
13	6	01	17	14	7	05	18	17	7	02	18	09	7	06	18	08	7	05	18	06	7	15	18	15
17	5	58	17	17	7	02	18	20	6	58	18	12	7	02	18	11	7	01	18	10	7	11	18	18
21	5	54	17	19	6	59	18	22	6	55	18	15	6	59	18	14	6	57	18	13	7	07	18	22
25	5	51	17	22	6	55	18	25	6	51	18	18	6	54	18	18	6	53	18	16	7	03	18	25
Mar. 1	5	47	17	24	6	51	18	27	6	47	18	21	6	50	18	20	6	49	18	19	6	58	18	28
5	5	43	17	26	6	47	18	29	6	43	18	23	6	45	18	23	6	44	18	22	6	54	18	31
9	5	39	17	28	6	43	18	32	6	38	18	26	6	41	18	26	6	40	18	25	6	49	18	34
13	5	35	17	30	6	40	18	34	6	34	18	28	6	36	18	29	6	35	18	28	6	44	18	37
17	5	31	17	32	6	35	18	36	6	29	18	30	6	31	18	31	6	30	18	30	6	39	18	39
21	5	27	17	34	6	30	18	38	6	25	18	33	6	26	18	34	6	25	18	33	6	34	18	42
25	5	22	17	36	6	26	18	40	6	20	18	35	6	21	18	37	6	20	18	35	6	29	18	45
29	5	18	17	38	6	22	18	42	6	16	18	37	6	16	18	39	6	15	18	38	6	24	18	47
Apr. 2	5	14	17	40	6	17	18	44	6	11	18	39	6	11	18	42	6	10	18	41	6	19	18	50
6	5	10	17	42	6	13	18	46	6	06	18	41	6	06	18	44	6	05	18	43	6	14	18	53
10	5	06	17	44	6	09	18	48	6	02	18	44	6	02	18	47	6	00	18	46	6	09	18	55
14	5	02	17	46	6	05	18	50	5	58	18	46	5	57	18	49	5	55	18	48	6	04	18	58
18	4	58	17	48	6	01	18	52	5	53	18	48	5	52	18	52	5	51	18	51	6	00	19	01
22	4	54	17	50	5	57	18	54	5	49	18	51	5	48	18	54	5	47	18	54	5	55	19	03
26	4	50	17	52	5	53	18	56	5	46	18	53	5	44	18	57	5	42	18	56	5	51	19	06
30	4	47	17	54	5	50	18	58	5	42	18	55	5	40	19	00	5	39	18	59	5	47	19	09
May 4	4	44	17	56	5	47	19	01	5	39	18	58	5	37	19	02	5	35	19	02	5	43	19	12
8	4	41	17	58	5	44	19	03	5	36	19	00	5	33	19	05	5	32	19	05	5	40	19	15
12	4	39	18	00	5	41	19	05	5	33	19	03	5	30	19	08	5	28	19	07	5	37	19	17
16	4	37	18	02	5	39	19	07	5	30	19	05	5	28	19	10	5	26	19	10	5	34	19	20
20	4	35	18	04	5	37	19	10	5	28	19	07	5	25	19	13	5	23	19	13	5	31	19	23
24	4	33	18	07	5	35	19	12	5	26	19	10	5	23	19	15	5	21	19	15	5	29	19	25
28	4	32	18	09	5	34	19	14	5	25	19	12	5	22	19	18	5	20	19	18	5	28	19	28
June 1	4	31	18	11	5	33	19	16	5	24	19	14	5	21	19	20	5	19	19	20	5	26	19	30
5	4	31	18	12	5	33	19	18	5	23	19	16	5	20	19	22	5	18	19	22	5	26	19	32
9	4	30	18	14	5	32	19	19	5	23	19	17	5	19	19	24	5	17	19	24	5	25	19	34
13	4	30	18	16	5	32	19	21	5	23	19	19	5	19	19	26	5	17	19	25	5	25	19	36
17	4	31	18	17	5	33	19	22	5	23	19	21	5	20	19	27	5	18	19	27	5	25	19	37
21	4	32	18	18	5	34	19	23	5	24	19	22	5	20	19	28	5	18	19	28	5	26	19	38
25	4	32	18	19	5	35	19	24	5	25	19	22	5	21	19	29	5	19	19	29	5	27	19	39
29	4	34	18	19	5	34	19	24	5	26	19	23	5	22	19	29	5	20	19	29	5	28	19	39
July 3	4	35	18	19	5	37	19	24	5	28	19	23	5	24	19	29	5	22	19	29	5	30	19	39

N.B.—To obtain the times of Sunrise and Sunset in L.M.T. apply the correction for L.M.T. as indicated above for each station.

Sunrise and Sunset *(upper limb)* for certain places in 1999

(Indian Standard Time)

Date	Guwahati 26°N 10′ L.M.T. Corr. +37^m.0				Jaipur 26°N 55′ L.M.T. Corr. –26^m.7				Delhi 28°N 39′ L.M.T. Corr. –21^m.1				Chandigarh 30°N 44′ L.M.T. Corr. –22^m.5				Simla 31°N 06′ L.M.T. Corr. –21^m.3				Amritasar 31°N 38′ L.M.T. Corr. –30^m.5			
	Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set		Rise		Set	
	h	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*	*h*	*m*
July 3	4	35	18	19	5	37	19	24	5	28	19	23	5	24	19	29	5	22	19	29	5	30	19	39
7	4	37	18	19	5	39	19	24	5	29	19	23	5	26	19	29	5	24	19	28	5	32	19	39
11	4	38	18	18	5	40	19	24	5	31	19	22	5	28	19	28	5	26	19	28	5	34	19	38
15	4	40	18	17	5	42	19	23	5	33	19	21	5	30	19	27	5	28	19	26	5	36	19	37
19	4	42	18	16	5	44	19	21	5	35	19	19	5	32	19	25	5	30	19	25	5	38	19	35
23	4	44	18	15	5	46	19	20	5	37	19	18	5	34	19	23	5	33	19	23	5	41	19	33
27	4	46	18	13	5	48	19	18	5	40	19	15	5	37	19	21	5	35	19	20	5	43	19	30
31	4	48	18	10	5	51	19	15	5	42	19	13	5	39	19	18	5	38	19	17	5	46	19	28
Aug. 4	4	50	18	08	5	53	19	13	5	44	19	10	5	42	19	15	5	40	19	14	5	48	19	24
8	4	52	18	05	5	55	19	10	5	46	19	07	5	44	19	11	5	43	19	11	5	51	19	21
12	4	54	18	02	5	57	19	07	5	49	19	03	5	47	19	08	5	45	19	07	5	53	19	17
16	4	56	17	58	5	59	19	03	5	51	19	00	5	49	19	04	5	48	19	03	5	56	19	13
20	4	58	17	55	6	01	18	59	5	53	18	56	5	52	19	00	5	50	18	59	5	59	19	09
24	5	00	17	51	6	02	18	56	5	55	18	52	5	54	18	55	5	53	18	55	6	01	19	04
28	5	01	17	47	6	04	18	51	5	57	18	47	5	56	18	51	5	55	18	50	6	04	19	00
Sept. 1	5	03	17	43	6	06	18	47	5	59	18	43	5	59	18	46	5	57	18	45	6	06	18	55
5	5	05	17	39	6	08	18	43	6	01	18	38	6	01	18	41	6	00	18	40	6	08	18	50
9	5	06	17	34	6	10	18	39	6	03	18	34	6	03	18	36	6	02	18	35	6	11	18	45
13	5	08	17	30	6	11	18	34	6	05	18	29	6	06	18	31	6	04	18	30	6	13	18	39
17	5	09	17	25	6	13	18	29	6	07	18	24	6	08	18	26	6	07	18	25	6	16	18	34
21	5	11	17	21	6	15	18	24	6	09	18	19	6	10	18	21	6	09	18	20	6	18	18	29
25	5	13	17	15	6	16	18	20	6	11	18	15	6	12	18	16	6	11	18	15	6	20	18	24
29	5	14	17	12	6	18	18	16	6	13	18	10	6	15	18	11	6	14	18	08	6	23	18	18
Oct. 3	5	16	17	08	6	20	18	11	6	15	18	05	6	17	18	06	6	16	18	04	6	25	18	13
7	5	18	17	03	6	22	18	07	6	17	18	01	6	20	18	01	6	19	18	00	6	28	18	08
11	5	20	16	59	6	24	18	03	6	20	17	56	6	22	17	56	6	21	17	55	6	31	18	04
15	5	22	16	55	6	26	17	59	6	22	17	52	6	25	17	52	6	24	17	50	6	33	17	59
19	5	24	16	52	6	28	17	55	6	24	17	48	6	27	17	47	6	27	17	46	6	36	17	54
23	5	26	16	48	6	31	17	51	6	27	17	44	6	30	17	43	6	30	17	41	6	39	17	50
27	5	29	16	45	6	33	17	48	6	30	17	40	6	33	17	39	6	33	17	38	6	42	17	46
31	5	31	16	42	6	36	17	45	6	32	17	37	6	36	17	36	6	36	17	34	6	46	17	42
Nov. 4	5	34	16	39	6	38	17	42	6	35	17	34	6	39	17	32	6	39	17	31	6	49	17	39
8	5	36	16	37	6	41	17	39	6	38	17	31	6	43	17	29	6	42	17	28	6	52	17	36
12	5	39	16	35	6	44	17	37	6	41	17	29	6	46	17	27	6	46	17	25	6	56	17	33
16	5	42	16	33	6	47	17	36	6	44	17	27	6	49	17	25	6	49	17	23	6	59	17	31
20	5	45	16	32	6	50	17	34	6	48	17	26	6	53	17	23	6	52	17	21	7	03	17	29
24	5	48	16	31	6	53	17	33	6	51	17	24	6	56	17	22	6	56	17	20	7	06	17	28
28	5	51	16	30	6	56	17	33	6	54	17	24	7	00	17	21	6	59	17	19	7	10	17	27
Dec. 2	5	54	16	30	6	59	17	33	6	57	17	24	7	03	17	20	7	03	17	18	7	13	17	26
6	5	57	16	31	7	02	17	33	7	00	17	24	7	06	17	20	7	06	17	19	7	16	17	26
10	5	59	16	32	7	05	17	34	7	03	17	24	7	09	17	21	7	09	17	19	7	19	17	27
14	6	02	16	33	7	07	17	35	7	06	17	26	7	12	17	22	7	11	17	20	7	22	17	28
18	6	04	16	34	7	10	17	36	7	08	17	27	7	14	17	23	7	14	17	21	7	24	17	29
22	6	07	16	36	7	12	17	38	7	10	17	29	7	16	17	25	7	16	17	23	7	27	17	31
26	6	08	16	38	7	14	17	40	7	12	17	31	7	18	17	28	7	18	17	26	7	28	17	33
30	6	10	16	41	7	15	17	43	7	14	17	33	7	20	17	30	7	19	17	28	7	30	17	36
Jan. 3	6	11	16	43	7	16	17	46	7	15	17	36	7	21	17	33	7	20	17	31	7	31	17	39

N.B.—To obtain the times of Sunrise and Sunset for the centre of the Sun, apply correction of + 3.5*m* for Rise and –3.5*m* for Set.

Local Mean Time of Sunrise and Sunset, 1999

Date	Sunrise 0°	Sunrise +10°	Sunrise +20°	Sunrise +30°	Sunrise +35°	Mid-day	Sunset 0°	Sunset +10°	Sunset +20°	Sunset +30°	Sunset +35°
	h m	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*
Jan. 0	5 59	6 16	6 35	6 56	7 08	12 03	18 07	17 49	17 31	17 10	16 58
4	6 01	6 18	6 36	6 56	7 08	12 05	18 08	17 52	17 34	17 13	17 01
8	6 03	6 19	6 37	6 57	7 09	12 07	18 10	17 54	17 36	17 16	17 05
12	6 04	6 21	6 38	6 57	7 08	12 09	18 12	17 56	17 39	17 20	17 08
16	6 06	6 21	6 38	6 57	7 07	12 10	18 13	17 58	17 42	17 23	17 12
20	6 07	6 22	6 38	6 56	7 06	12 11	18 15	18 00	17 44	17 26	17 16
24	6 08	6 23	6 37	6 54	7 04	12 12	18 16	18 02	17 47	17 30	17 20
28	6 09	6 23	6 37	6 53	7 02	12 13	18 16	18 03	17 49	17 33	17 24
Feb. 1	6 10	6 22	6 36	6 51	6 59	12 14	18 17	18 05	17 52	17 37	17 28
5	6 10	6 22	6 34	6 48	6 56	12 14	18 17	18 06	17 54	17 40	17 32
9	6 11	6 21	6 33	6 45	6 53	12 14	18 18	18 07	17 56	17 43	17 36
13	6 11	6 20	6 31	6 42	6 49	12 14	18 18	18 08	17 58	17 47	17 40
17	6 11	6 19	6 28	6 39	6 44	12 14	18 17	18 09	18 00	17 50	17 44
21	6 10	6 18	6 26	6 35	6 40	12 13	18 17	18 10	18 02	17 53	17 48
25	6 10	6 16	6 23	6 31	6 35	12 13	18 16	18 10	18 03	17 56	17 52
Mar. 1	6 09	6 15	6 20	6 27	6 30	12 12	18 16	18 10	18 05	17 59	17 55
5	6 08	6 13	6 17	6 22	6 25	12 12	18 15	18 11	18 06	18 01	17 59
9	6 07	6 11	6 14	6 16	6 20	12 11	18 14	18 11	18 08	18 04	18 02
13	6 06	6 08	6 11	6 13	6 14	12 10	18 13	18 11	18 09	18 07	18 05
17	6 05	6 06	6 07	6 08	6 09	12 09	18 12	18 11	18 10	18 09	18 09
21	6 04	6 04	6 04	6 03	6 03	12 07	18 11	18 11	18 11	18 12	18 12
25	6 03	6 02	6 00	5 59	5 57	12 06	18 09	18 11	18 12	18 14	18 15
29	6 02	5 59	5 57	5 54	5 52	12 05	18 08	18 11	18 13	18 17	18 18
Apr. 2	6 00	5 57	5 53	5 49	5 46	12 04	18 07	18 11	18 14	18 19	18 22
6	5 59	5 55	5 50	5 44	5 41	12 03	18 06	18 10	18 15	18 21	18 25
10	5 58	5 53	5 46	5 39	5 35	12 02	18 05	18 10	18 17	18 24	18 28
14	5 57	5 50	5 43	5 35	5 30	12 00	18 04	18 10	18 18	18 26	18 31
18	5 56	5 48	5 40	5 31	5 25	11 59	18 03	18 11	18 19	18 29	18 34
22	5 55	5 47	5 37	5 26	5 20	11 59	18 02	18 11	18 20	18 31	18 38
26	5 54	5 45	5 34	5 22	5 15	11 58	18 01	18 11	18 22	18 34	18 41
30	5 54	5 43	5 32	5 19	5 11	11 57	18 01	18 11	18 23	18 36	18 44
May 4	5 53	5 42	5 29	5 15	5 07	11 57	18 00	18 12	18 24	18 39	18 47
8	5 53	5 41	5 27	5 12	5 03	11 56	18 00	18 12	18 26	18 42	18 51
12	5 53	5 40	5 25	5 09	4 59	11 56	18 00	18 13	18 28	18 44	18 54
16	5 53	5 39	5 24	5 06	4 56	11 56	18 00	18 14	18 29	18 47	18 57
20	5 53	5 38	5 22	5 04	4 53	11 57	18 00	18 15	18 31	18 49	19 00
24	5 53	5 38	5 21	5 02	4 51	11 57	18 00	18 16	18 32	18 52	19 03
28	5 54	5 38	5 21	5 01	4 49	11 58	18 01	18 17	17 34	18 54	19 06
June 1	5 54	5 38	5 20	4 59	4 47	11 58	18 01	18 18	18 36	18 56	19 08
5	5 55	5 38	5 20	4 59	4 46	11 59	18 02	18 19	18 37	18 58	19 11
9	5 55	5 38	5 20	4 58	4 46	11 59	18 03	18 20	18 39	19 00	19 13
13	5 56	5 39	5 20	4 58	4 45	12 00	18 04	18 21	18 40	19 02	19 15
17	5 57	5 40	5 21	4 59	4 46	12 01	18 04	18 22	18 41	19 03	19 16
21	5 58	5 40	5 21	4 59	4 46	12 02	18 05	18 23	18 42	19 04	19 17
25	5 59	5 41	5 22	5 00	4 47	12 02	18 06	18 24	18 43	19 05	19 18
29	6 00	5 42	5 23	5 02	4 49	12 03	18 07	18 24	18 43	19 05	19 18
July 3	6 00	5 43	5 25	5 03	4 50	12 04	18 08	18 25	18 44	19 05	19 18

The timings relate to the visibility of the upper limb of the Sun on the horizon, and as such include refraction and limb-correction amounting to a total of about $3\frac{1}{2}$ mins. (3 mins. for 0° or 10° lat., and 4 mins. for 30° or 35° lat.). For this reason the above times have been obtained by *diminishing* the calculated figures by the above amount for sunrise and *increasing* for sunset.

The L. M. T. of rise and set for intermediate latitudes and dates may be obtained by simple proportion. Thereafter, the timings can be converted into I.S.T. by inverse application of the local time correction for the place.

Local Mean Time of Sunrise and Sunset, 1999

Date	Sunrise 0°	Sunrise +10°	Sunrise +20°	Sunrise +30°	Sunrise +35°	Mid-day	Sunset 0°	Sunset +10°	Sunset +20°	Sunset +30°	Sunset +35°
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
July 3	6 00	5 43	5 26	5 03	4 50	12 04	18 08	18 25	18 44	19 05	19 18
7	6 01	5 44	5 26	5 05	4 52	12 04	18 08	18 25	18 44	19 05	19 17
11	6 02	5 45	5 28	5 07	4 54	12 05	18 09	18 26	18 43	19 04	19 16
15	6 02	5 46	5 29	5 09	4 57	12 05	18 10	18 26	18 43	19 03	19 15
19	6 03	5 47	5 30	5 11	5 00	12 06	18 10	18 25	18 42	19 01	19 13
23	6 03	5 48	5 32	5 13	5 02	12 06	18 10	18 25	18 41	18 59	19 10
27	6 03	5 49	5 33	5 16	5 05	12 06	18 10	18 24	18 39	18 57	19 07
31	6 03	5 49	5 35	5 18	5 08	12 06	18 10	18 23	18 38	18 54	19 04
Aug. 4	6 03	5 50	5 36	5 20	5 11	12 06	18 10	18 22	18 36	18 51	19 01
8	6 02	5 50	5 38	5 23	5 14	12 05	18 09	18 21	18 33	18 48	18 57
12	6 02	5 51	5 39	5 25	5 17	12 05	18 08	18 19	18 31	18 45	18 52
16	6 01	5 51	5 40	5 28	5 20	12 04	18 08	18 18	18 28	18 41	18 48
20	6 00	5 51	5 41	5 30	5 23	12 03	18 07	18 16	18 25	18 37	18 43
24	5 59	5 51	5 42	5 32	5 26	12 02	18 06	18 14	18 22	18 32	18 38
28	5 58	5 51	5 43	5 34	5 29	12 01	18 05	18 12	18 19	18 28	18 33
Sept. 1	5 57	5 51	5 44	5 37	5 32	12 00	18 03	18 09	18 16	18 23	18 27
5	5 56	5 51	5 45	5 39	5 35	11 59	18 02	18 07	18 12	18 18	18 22
9	5 54	5 50	5 46	5 41	5 38	11 58	18 01	18 04	18 09	18 13	18 16
13	5 53	5 50	5 47	5 43	5 41	11 56	17 59	18 02	18 05	18 09	18 11
17	5 51	5 50	5 48	5 45	5 44	11 54	17 58	17 59	18 01	18 04	18 05
21	5 50	5 49	5 48	5 47	5 47	11 53	17 56	17 57	17 58	17 59	17 59
25	5 49	5 49	5 49	5 50	5 50	11 52	17 55	17 54	17 54	17 54	17 53
29	5 47	5 48	5 50	5 51	5 52	11 51	17 54	17 53	17 52	17 51	17 50
Oct. 3	5 46	5 48	5 50	5 52	5 53	11 49	17 52	17 50	17 48	17 45	17 43
7	5 45	5 48	5 51	5 56	5 57	11 48	17 51	17 48	17 45	17 41	17 39
11	5 44	5 47	5 52	5 56	5 59	11 47	17 50	17 46	17 41	17 36	17 33
15	5 43	5 48	5 54	6 00	6 03	11 46	17 49	17 44	17 38	17 32	17 29
19	5 42	5 48	5 54	6 01	6 05	11 45	17 48	17 42	17 35	17 27	17 22
23	5 41	5 49	5 57	6 06	6 11	11 44	17 48	17 40	17 32	17 24	17 18
27	5 41	5 49	5 57	6 07	6 12	11 44	17 47	17 39	17 31	17 22	17 16
31	5 40	5 49	5 59	6 09	6 15	11 44	17 47	17 38	17 27	17 16	17 10
Nov. 4	5 40	5 51	6 02	6 15	6 22	11 44	17 47	17 37	17 25	17 13	17 06
8	5 40	5 51	6 03	6 17	6 24	11 44	17 47	17 36	17 24	17 11	17 03
12	5 41	5 52	6 05	6 19	6 27	11 45	17 48	17 36	17 23	17 09	17 01
16	5 41	5 54	6 07	6 22	6 32	11 45	17 48	17 36	17 23	17 08	16 59
20	5 42	5 55	6 10	6 26	6 35	11 46	17 49	17 36	17 22	17 06	16 56
24	5 43	5 57	6 12	6 30	6 40	11 47	17 50	17 36	17 21	17 04	16 54
28	5 44	5 59	6 16	6 34	6 45	11 48	17 51	17 36	17 20	17 02	16 51
Dec. 2	5 46	6 00	6 16	6 34	6 44	11 49	17 53	17 38	17 23	17 05	16 55
6	5 47	6 03	6 20	6 39	6 50	11 51	17 55	17 39	17 22	17 03	16 51
10	5 49	6 04	6 21	6 40	6 51	11 53	17 56	17 41	17 24	17 05	16 55
14	5 51	6 08	6 26	6 46	6 58	11 54	17 58	17 41	17 23	17 03	16 51
18	5 53	6 09	6 27	6 48	7 00	11 56	18 00	17 43	17 26	17 05	16 53
22	5 55	6 11	6 29	6 50	7 01	11 58	18 02	17 45	17 28	17 07	16 55
26	5 57	6 13	6 31	6 52	7 04	12 00	18 04	17 47	17 29	17 09	16 57
30	5 59	6 16	6 34	6 54	7 06	12 02	18 06	17 49	17 31	17 10	16 58
Jan. 3	6 01	6 16	6 33	6 51	7 02	12 04	18 08	17 52	17 36	17 17	17 06

The timings relate to the visibility of the upper limb of the Sun on the horizon, and as such include refraction and limb-correction amounting to a total of about $3\frac{1}{2}$ mins. (3 mins. for 0° or 10° lat., and 4 mins. for 30° or 35° lat.). For this reason the above times have been obtained by *diminishing* the calculated figures by the above amount for sunrise and *increasing* for sunset.

The L. M. T. of rise and set for intermediate latitudes and dates may be obtained by simple proportion. Thereafter, the timings can be converted into I.S.T. by inverse application of the local time correction for the place.

Moonrise and Moonset, 1999

Date	Local Mean Time of Moonrise & Moonset (Upper Limb)						Indian Standard Time of Moonrise & Moonset (Upper Limb)							
	Latitude						Chennai 13° N 4′		Mumbai 18° N 58′		Calcutta 22° N 35′		Delhi 28° N 39′	
	10°N0′		20°N0′		30°N0′									
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Jan. 0	16 14	4 09	15 59	4 23	15 42	4 38	16 19	4 22	16 41	5 02	15 31	4 02	16 07	4 58
1	17 13	5 10	16 57	5 26	16 39	5 44	17 17	5 24	17 39	6 04	16 28	5 06	17 03	6 03
2	18 12	6 11	17 57	6 27	17 39	6 45	18 17	6 25	18 39	7 05	17 28	6 07	18 03	7 05
3	19 11	7 09	18 57	7 25	18 40	7 42	19 16	7 23	19 38	8 03	18 28	7 04	19 04	8 01
4	20 08	8 04	19 55	8 17	19 41	8 33	20 13	8 17	20 37	8 56	19 28	7 57	20 05	8 52
5	21 01	8 54	20 52	9 05	20 41	9 18	21 08	9 07	21 33	9 44	20 25	8 44	21 04	9 38
6	21 52	9 41	21 46	9 49	21 38	9 58	21 59	9 53	22 26	10 23	21 20	9 27	22 01	10 18
7	22 40	10 25	22 37	10 29	22 33	10 35	22 49	10 35	23 17	11 09	22 12	10 07	22 56	10 56
8	23 27	11 06	23 27	11 07	23 27	11 09	23 36	11 16	—	11 47	23 03	10 44	23 49	11 31
9	—	11 46	—	11 44	—	11 42	—	11 55	0 07	12 24	23 52	11 20	—	12 04
10	0 12	12 25	0 15	12 21	0 19	12 15	0 22	12 33	0 55	13 01	—	11 55	0 40	12 38
11	0 58	13 05	1 04	12 58	1 11	12 47	1 09	13 12	1 43	13 38	0 41	12 32	1 32	13 12
12	1 43	13 47	1 53	13 36	2 03	13 24	1 55	13 53	2 31	14 17	1 31	13 09	2 23	13 48
13	2 30	14 30	2 42	14 17	2 55	14 03	2 43	14 35	3 21	14 58	2 21	13 50	3 15	14 26
14	3 19	15 15	3 32	15 01	3 48	14 44	3 32	15 20	4 11	15 42	3 12	14 33	4 08	15 08
15	4 08	16 04	4 24	15 48	4 41	15 30	4 22	16 08	5 02	16 30	4 04	15 19	5 00	15 54
16	4 59	16 54	5 15	16 38	5 33	16 20	5 13	16 59	5 53	17 20	4 55	16 10	5 53	16 44
17	5 51	17 47	6 06	17 31	6 24	17 14	6 04	17 51	6 44	18 13	5 46	17 03	6 43	17 38
18	6 42	18 40	6 56	18 27	7 13	18 11	6 55	18 46	7 34	19 08	6 36	17 59	7 32	18 35
19	7 32	19 34	7 44	19 23	7 58	19 10	7 45	19 40	8 23	20 04	7 23	18 56	8 18	19 34
20	8 21	20 28	8 30	20 20	8 41	20 11	8 33	20 35	9 08	21 01	8 09	19 53	9 02	20 34
21	9 08	21 22	9 15	21 17	9 22	21 12	9 20	21 30	9 54	21 58	8 53	20 51	9 43	21 34
22	9 55	22 15	9 58	22 14	10 02	22 13	10 05	22 24	10 38	22 55	9 35	21 50	10 23	22 35
23	10 42	23 09	10 41	23 12	10 40	23 15	10 51	23 19	11 21	23 52	10 17	22 48	11 02	23 37
24	11 29	—	11 25	—	11 20	—	11 37	—	12 05	—	11 00	23 48	11 42	—
25	12 18	0 04	12 10	0 11	12 01	0 18	12 25	0 15	12 51	0 50	11 44	—	12 24	0 39
26	13 09	1 00	12 58	1 10	12 45	1 21	13 15	1 13	13 39	1 49	12 31	0 49	13 09	1 42
27	14 03	1 58	13 49	2 11	13 34	2 25	14 08	2 11	14 31	2 50	13 21	1 50	13 58	2 45
28	14 59	2 57	14 44	3 12	14 26	3 29	15 04	3 11	15 26	3 51	14 15	2 52	14 51	3 48
29	15 57	3 36	15 41	4 12	15 23	4 30	16 02	4 10	16 23	4 51	15 13	3 52	15 48	4 50
30	16 55	4 54	16 40	5 10	16 23	5 28	17 00	5 08	17 22	5 49	16 12	4 50	16 47	5 47
31	17 53	5 50	17 39	6 04	17 23	6 21	17 58	6 04	18 21	6 43	17 11	5 44	17 48	6 40
Feb. 1	18 48	6 42	18 37	6 55	18 24	7 09	18 54	6 55	19 18	7 33	18 09	6 34	18 48	7 28
2	19 40	7 31	19 32	7 41	19 23	7 51	19 47	7 43	20 13	8 19	19 06	7 19	19 46	8 11
3	20 30	8 17	20 25	8 23	20 20	8 30	20 38	8 28	21 06	9 02	20 00	8 01	20 43	8 51
4	21 18	9 00	21 19	9 03	21 15	9 06	21 27	9 10	21 57	9 42	20 52	8 40	21 37	9 27
5	22 05	9 41	22 07	9 40	22 09	9 40	22 15	9 50	22 46	10 20	21 43	9 16	22 30	10 02
6	22 51	10 21	22 56	10 17	23 01	10 14	23 01	10 29	23 35	10 57	22 33	9 53	23 22	10 36
7	23 37	11 01	23 44	10 54	23 53	10 47	23 48	11 08	—	11 35	23 22	10 29	—	11 10
8	—	11 42	—	11 32	—	11 22	—	11 46	0 23	12 13	—	11 06	0 14	11 45
9	0 23	12 24	0 33	12 12	0 46	11 59	0 35	12 29	1 12	12 53	0 12	11 45	1 06	12 22
10	1 10	13 08	1 23	12 54	1 38	12 38	1 23	13 13	2 02	13 35	1 02	12 26	1 58	13 02
11	1 59	13 55	2 14	13 39	2 30	13 22	2 13	13 59	2 52	14 21	1 53	13 11	2 50	13 46
12	2 49	14 44	3 05	14 28	3 23	14 10	3 03	14 48	3 48	15 10	2 45	13 59	3 42	14 34
13	3 40	15 35	3 56	15 20	4 14	15 02	3 54	15 40	4 34	16 01	3 36	14 51	4 33	15 26
14	4 31	16 29	4 46	16 14	5 04	15 58	4 45	16 34	5 25	16 56	4 26	15 46	5 23	16 22
15	5 22	17 23	5 36	17 11	5 51	16 57	5 36	17 29	6 14	17 53	5 15	16 43	6 11	17 21

N.B.—The timings for 10°, 20° & 30° Lat. which are given in L.M.T. relate to the visibility of the upper limb of the Moon on the horizon of the Central Meridian of India ($82\frac{1}{2}$° E).

Moonrise and Moonset, 1999

Date	Local Mean Time of Moonrise & Moonset (Upper Limb) — Latitude 10°N0′ Rise	10°N0′ Set	20°N0′ Rise	20°N0′ Set	30°N0′ Rise	30°N0′ Set	Indian Standard Time of Moonrise & Moonset (Upper Limb) — Channai 13° N 4′ Rise	Channai Set	Mumbai 18° N 58′ Rise	Mumbai Set	Calcutta 22° N 35′ Rise	Calcutta Set	Delhi 28° N 39′ Rise	Delhi Set
	h m	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*
Feb. 16	6 13	18 19	6 24	18 09	6 36	17 58	6 25	18 25	7 02	18 50	6 02	17 42	6 56	18 22
17	7 02	19 14	7 10	19 08	7 19	19 01	7 14	19 21	7 49	19 48	6 48	18 42	7 39	19 24
18	7 51	20 09	7 55	20 06	8 00	20 04	8 01	20 18	8 34	20 47	7 32	19 41	8 21	20 26
19	8 39	21 04	8 39	21 06	8 40	21 07	8 48	21 14	9 19	21 46	8 15	20 42	9 01	21 29
20	9 27	22 00	9 24	22 05	9 20	22 11	9 35	22 11	10 04	22 45	8 59	21 42	9 42	22 32
21	10 16	22 56	10 09	23 05	10 01	23 15	10 23	23 08	10 50	23 44	9 43	22 43	10 24	23 36
22	11 07	23 54	10 56	—	10 45	—	11 13	—	11 37	—	10 29	23 44	11 08	—
23	11 59	—	11 46	0 05	11 31	0 19	12 05	0 06	12 28	0 44	11 18	—	11 55	0 39
24	12 54	0 51	12 39	1 06	12 22	1 22	12 59	1 05	13 20	1 44	12 10	0 45	12 46	1 42
25	13 50	1 49	13 34	2 05	13 16	2 23	13 54	2 03	14 16	2 44	13 05	1 45	13 40	2 42
26	14 46	2 47	14 31	3 02	14 13	3 21	14 51	3 01	15 13	3 41	14 02	2 42	14 37	3 40
27	15 43	3 42	15 28	3 57	15 12	4 14	15 48	3 55	16 10	4 35	15 00	3 36	15 36	4 33
28	16 37	4 34	16 25	4 47	16 11	5 02	16 43	4 47	17 07	5 26	15 58	4 27	16 35	5 22
Mar. 1	17 30	5 23	17 21	5 34	17 10	5 46	17 37	5 36	18 02	6 13	16 54	5 13	17 34	6 06
2	18 21	6 09	18 15	6 17	18 07	6 26	18 28	6 21	18 55	6 56	17 49	5 55	18 30	6 46
3	19 10	6 53	19 07	6 58	19 03	7 03	19 18	7 04	19 47	7 37	18 42	6 35	19 26	7 24
4	19 57	7 35	19 57	7 36	19 58	7 38	20 06	7 45	20 37	8 16	19 33	7 13	20 20	7 59
5	20 43	8 16	20 47	8 14	20 51	8 11	20 54	8 24	21 27	8 54	20 24	7 49	21 12	8 33
6	21 30	8 56	21 36	8 51	21 44	8 45	21 41	9 04	22 15	9 31	21 14	8 26	22 05	9 08
7	22 16	9 37	22 25	9 29	22 36	9 19	22 28	9 43	23 04	10 09	22 04	9 02	22 57	9 42
8	23 03	10 18	23 15	10 07	23 29	9 55	23 16	10 24	23 53	10 48	22 54	9 41	23 48	10 19
9	23 51	11 01	—	10 48	—	10 34	—	11 07	—	11 30	23 44	10 21	—	10 57
10	—	11 46	0 05	11 32	0 21	11 15	0 04	11 51	0 43	12 13	—	11 04	0 40	11 39
11	0 39	12 34	0 55	12 18	1 12	12 00	0 53	12 38	1 33	13 00	0 35	11 50	1 32	12 25
12	1 29	13 24	1 45	13 08	2 03	12 49	1 43	13 28	2 23	13 49	1 25	12 39	2 22	13 14
13	2 18	14 15	2 35	14 00	2 53	13 43	2 33	14 20	3 13	14 42	2 15	13 32	3 12	14 07
14	3 10	15 09	3 24	14 55	3 41	14 40	3 24	15 14	4 03	15 37	3 04	14 27	4 00	15 04
15	4 00	16 04	4 13	15 53	4 27	15 40	4 13	16 10	4 51	16 34	3 52	15 25	4 46	16 04
16	4 50	16 59	5 00	16 51	5 10	16 42	5 02	17 06	5 38	17 32	4 38	16 25	5 30	17 06
17	5 40	17 55	5 46	17 51	5 52	17 46	5 51	18 03	6 25	18 32	5 23	17 26	6 13	18 09
18	6 29	18 52	6 31	18 52	6 34	18 51	6 39	19 01	7 11	19 32	6 08	18 27	6 55	19 13
19	7 18	19 49	7 17	19 53	7 15	19 57	7 27	20 00	7 57	20 33	6 52	19 29	7 37	20 19
20	8 09	20 47	8 03	20 55	7 57	21 03	8 16	20 59	8 44	21 34	7 37	20 32	8 19	21 24
21	9 01	21 46	8 51	21 57	8 41	22 10	9 07	21 59	9 32	22 36	8 25	21 36	9 04	22 30
22	9 54	22 46	9 42	22 59	9 28	23 15	10 00	22 59	10 23	23 38	9 14	22 39	9 51	23 35
23	10 49	23 45	10 35	—	10 18	—	10 54	23 59	11 16	—	10 06	23 40	10 42	—
24	11 45	—	11 30	0 00	11 11	0 18	11 50	—	12 11	0 39	11 01	—	11 36	0 37
25	12 42	0 42	12 26	0 58	12 08	1 17	12 47	0 57	13 08	1 37	11 57	0 39	12 32	1 36
26	13 38	1 38	13 23	1 53	13 06	2 11	13 43	1 52	14 05	2 32	12 55	1 33	13 30	2 30
27	14 32	2 31	14 19	2 44	14 05	3 00	14 38	2 44	15 01	3 23	13 52	2 24	14 29	3 20
28	15 25	3 20	15 15	3 31	15 03	3 45	15 31	3 33	15 56	4 10	14 47	3 11	15 26	4 04
29	16 15	4 06	16 08	4 15	16 00	4 25	16 22	4 18	16 49	4 54	15 42	3 53	16 23	4 45
30	17 04	4 50	17 00	4 56	16 55	5 02	17 12	5 01	17 40	5 35	16 35	4 33	17 18	5 23
31	17 51	5 32	17 51	5 34	17 50	5 37	18 00	5 42	18 31	6 14	17 26	5 11	18 12	5 58

N.B. —To calculate the times of Moonrise and Moonset for Calcutta and eastern India *subtract* 1 minute in the times of L.M.T. and for Delhi, Mumbai, Chennai etc. and western India *add* 1 minute to get the corrected L.M.T. for the required Meridian.

Moonrise and Moonset, 1999

Date	Local Mean Time of Moonrise & Moonset (*Upper Limb*)						Indian Standard Time of Moonrise & Moonset (*Upper Limb*)							
	Latitude						Chennai 13° N 4′		Mumbai 18° N 58′		Calcutta 22° N 35′		Delhi 28° N 39′	
	10°N0′		20°N0′		30°N0′									
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*
Apr. 1	18 38	6 12	18 40	6 12	18 43	6 11	18 48	6 21	19 20	6 51	18 17	5 48	19 05	6 32
2	19 24	6 53	19 30	6 49	19 36	6 44	19 35	7 01	20 09	7 29	19 07	6 24	19 57	7 06
3	20 10	7 33	20 19	7 26	20 29	7 18	20 22	7 40	20 58	8 06	19 57	7 00	20 49	7 41
4	20 57	8 14	21 08	8 04	21 21	7 53	21 10	8 21	21 47	8 45	20 47	7 38	21 41	8 16
5	21 44	8 57	21 58	8 44	22 13	8 30	21 58	9 02	22 36	9 26	21 37	8 17	22 33	8 54
6	22 33	9 41	22 48	9 27	23 05	9 10	22 46	9 46	23 26	10 08	22 28	8 59	23 24	9 34
7	23 22	10 27	23 37	10 12	23 56	9 54	23 36	10 32	—	10 53	23 18	9 43	—	10 18
8	—	11 15	—	10 59	—	10 41	—	11 20	0 16	11 41	—	10 31	0 15	11 05
9	0 11	12 05	0 27	11 49	0 45	11 31	0 25	12 10	1 05	12 31	0 07	11 21	1 04	11 56
10	1 00	12 57	1 15	12 42	1 33	12 26	1 14	13 02	1 54	13 24	0 55	12 14	1 52	12 50
11	1 49	13 50	2 03	13 37	2 18	13 23	2 03	13 55	2 41	14 19	1 42	13 10	2 38	13 47
12	2 38	14 44	2 48	14 34	3 02	14 23	2 51	14 50	3 28	15 15	2 28	14 07	3 22	14 47
13	3 27	15 38	3 35	15 32	3 44	15 25	3 38	15 46	4 14	16 13	3 13	15 06	4 04	15 48
14	4 16	16 34	4 20	16 32	4 25	16 29	4 26	16 43	4 59	17 13	3 57	16 07	4 46	16 52
15	5 05	17 32	5 05	17 33	5 05	17 35	5 14	17 42	5 45	18 14	4 41	17 10	5 27	17 57
16	5 55	18 31	5 52	18 36	5 47	18 43	6 03	18 42	6 32	19 16	5 26	18 13	6 10	19 04
17	6 48	19 31	6 40	19 40	6 31	19 51	6 55	19 43	7 21	20 20	6 14	19 19	6 54	20 12
18	7 42	20 32	7 31	20 45	7 18	21 00	7 48	20 46	8 12	21 24	7 04	20 24	7 42	21 20
19	8 39	21 34	8 25	21 49	8 09	22 05	8 44	21 48	9 06	22 28	7 57	21 29	8 33	22 26
20	9 37	22 35	9 21	22 51	9 03	23 09	9 41	22 49	10 03	23 29	8 52	22 31	9 28	23 29
21	10 35	23 33	10 19	23 49	10 00	—	10 40	23 47	11 01	—	9 50	23 29	10 25	—
22	11 33	—	11 17	—	11 00	0 07	11 38	—	11 59	0 27	10 49	—	11 24	0 26
23	12 29	0 28	12 15	0 42	11 59	0 59	12 34	0 41	12 56	1 21	11 47	0 22	12 23	1 18
24	13 22	1 18	13 11	1 31	12 58	1 45	13 28	1 31	13 52	2 09	12 43	1 10	13 21	2 05
25	14 13	2 05	14 04	2 15	13 55	2 27	14 20	2 18	14 45	2 54	13 38	1 54	14 18	2 47
26	15 02	2 50	14 56	2 56	14 50	3 04	15 09	3 01	15 37	3 35	14 31	2 34	15 13	3 25
27	15 49	3 31	15 47	3 35	15 45	3 39	15 58	3 42	16 27	4 14	15 22	3 12	16 07	4 00
28	16 35	4 12	16 36	4 12	16 38	4 13	16 45	4 21	17 16	4 52	16 13	3 48	17 00	4 34
29	17 21	4 52	17 25	4 49	17 30	4 46	17 32	5 00	18 05	5 29	17 03	4 24	17 52	5 08
30	18 07	5 32	18 14	5 26	18 23	5 19	18 18	5 39	18 54	6 06	17 52	5 00	18 44	5 41
May 1	18 53	6 12	19 04	6 03	19 15	5 53	19 06	6 19	19 43	6 44	18 42	5 37	19 36	6 16
2	19 41	6 54	19 53	6 43	20 08	6 29	19 54	7 00	20 32	7 24	19 33	6 15	20 28	6 53
3	20 29	7 38	20 43	7 24	21 00	7 08	20 42	7 43	21 22	8 05	20 23	6 56	21 20	7 32
4	21 17	8 23	21 33	8 08	21 51	7 50	21 31	8 28	22 11	8 49	21 13	7 40	22 11	8 15
5	22 06	9 10	22 22	8 54	22 41	8 36	22 20	9 15	23 00	9 36	22 03	8 26	23 00	9 00
6	22 55	9 59	23 11	9 43	23 29	9 25	23 09	10 04	23 49	10 25	22 51	9 15	23 48	9 49
7	23 43	10 50	23 58	10 34	—	10 17	23 57	10 54	—	11 16	23 37	10 06	—	10 41
8	—	11 41	—	11 27	0 14	11 12	—	11 46	0 36	12 09	—	10 59	0 33	11 36
9	0 31	12 33	0 43	12 22	0 57	12 09	0 44	12 39	1 22	13 03	0 22	11 55	1 17	12 33
10	1 18	13 26	1 27	13 18	1 38	13 09	1 30	13 33	2 06	13 59	1 06	12 51	1 58	13 32
11	2 05	14 19	2 11	14 15	2 18	14 10	2 16	14 27	2 50	14 56	1 49	13 49	2 39	14 33
12	2 52	15 14	2 55	15 14	2 58	15 14	3 02	15 24	3 34	15 54	2 31	14 50	3 19	15 36
13	3 41	16 11	3 39	16 15	3 38	16 19	3 50	16 22	4 19	16 55	3 15	15 52	4 00	16 41
14	4 32	17 11	4 26	17 18	4 20	17 27	4 39	17 22	5 07	17 58	4 00	16 56	4 42	17 48
15	5 25	18 12	5 15	18 24	5 05	18 36	5 31	18 25	5 57	19 03	4 49	18 02	5 28	18 57
16	6 21	19 15	6 09	19 30	5 54	19 46	6 27	19 29	6 50	20 08	5 41	19 08	6 18	20 06
17	7 20	20 19	7 05	20 35	6 48	20 53	7 25	20 33	7 47	21 13	6 37	20 15	7 12	21 12

N.B. —From the corrected L. M. T. calculate for the exact latitude of the required place by interpolation when the place is between 10° N. and 30° N. and by extrapolation when the place falls outside 10° N. or 30°N Lat.

Moonrise and Moonset, 1999

Date	Local Mean Time of Moonrise & Moonset (Upper Limb)						Indian Standard Time of Moonrise & Moonset (Upper Limb)							
	Latitude						Chennai 13° N 4′		Mumbai 18° N 58′		Calcutta 22° N 35′		Delhi 28° N 39′	
	10°N0′		20°N0′		30°N0′									
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
May 18	8 21	21 21	8 05	21 37	7 46	21 56	8 25	21 35	8 47	22 15	7 36	21 17	8 10	22 15
19	9 21	22 19	9 05	22 35	8 47	22 52	9 26	22 33	9 47	23 13	8 36	22 14	9 11	23 12
20	10 20	23 13	10 05	23 27	9 48	23 42	10 25	23 26	10 47	—	9 37	23 06	10 13	—
21	11 16	—	11 04	—	10 49	—	11 22	—	11 45	0 05	10 36	23 53	11 13	0 02
22	12 09	0 03	11 59	0 14	11 48	0 26	12 16	0 15	12 41	0 52	11 33	—	12 12	0 46
23	12 59	0 49	12 53	0 57	12 45	1 06	13 07	1 00	13 33	1 36	12 27	0 35	13 08	1 26
24	13 47	1 32	13 44	1 36	13 40	1 42	13 55	1 42	14 24	2 15	13 19	1 14	14 03	2 03
25	14 33	2 12	14 34	2 14	14 34	2 16	14 43	2 22	15 14	2 53	14 09	1 50	14 56	2 37
26	15 19	2 52	15 23	2 50	15 27	2 48	15 29	3 01	16 02	3 30	14 59	2 26	15 48	3 10
27	16 05	3 32	16 11	3 27	16 19	3 21	16 16	3 39	16 51	4 07	15 49	3 01	16 40	3 43
28	16 51	4 12	17 00	4 04	17 11	3 55	17 03	4 19	17 39	4 44	16 39	3 38	17 32	4 18
29	17 38	4 53	17 50	4 42	18 04	4 30	17 51	4 59	18 28	5 23	17 29	4 15	18 24	4 53
30	18 25	5 36	18 40	5 23	18 56	5 08	18 39	5 41	19 18	6 04	18 19	4 55	19 16	5 32
31	19 14	6 21	19 30	6 06	19 48	5 49	19 28	6 26	20 08	6 47	19 10	5 38	20 07	6 13
June 1	20 03	7 08	20 20	6 51	20 38	6 33	20 17	7 12	20 58	7 33	20 00	6 23	20 58	6 57
2	20 52	7 56	21 08	7 40	21 27	7 21	21 06	8 01	21 47	8 21	20 49	7 11	21 46	7 45
3	21 41	8 46	21 56	8 30	22 13	8 12	21 54	8 51	22 34	9 12	21 36	8 02	22 32	8 36
4	22 28	9 37	22 41	9 22	22 56	9 06	22 41	9 42	23 20	10 04	22 21	8 54	23 16	9 30
5	23 14	10 28	23 25	10 16	23 37	10 02	23 27	10 33	—	10 57	23 04	9 48	23 57	10 26
6	—	11 19	—	11 10	—	10 59	—	11 26	0 04	11 51	23 48	10 43	—	11 23
7	0 00	12 11	0 08	12 05	0 16	11 58	0 12	12 18	0 47	12 46	—	11 39	0 37	12 21
8	0 46	13 03	0 50	13 01	0 55	12 59	0 56	13 12	1 29	13 42	0 27	12 36	1 16	13 21
9	1 32	13 58	1 32	13 59	1 33	14 01	1 41	14 07	2 12	14 39	1 08	13 35	1 54	14 23
10	2 20	14 54	2 16	14 59	2 12	15 06	2 28	15 05	2 56	15 39	1 51	14 36	2 34	15 27
11	3 10	15 53	3 03	16 02	2 54	16 13	3 17	16 05	3 43	16 41	2 37	15 40	3 17	16 33
12	4 04	16 54	3 53	17 07	3 40	17 22	4 10	17 07	4 34	17 46	3 25	16 46	4 04	17 41
13	5 01	17 58	4 47	18 13	4 31	18 30	5 06	18 11	5 28	18 51	4 19	17 52	4 55	18 50
14	6 01	19 01	5 45	19 18	5 27	19 36	6 06	19 15	6 27	19 56	5 16	18 58	5 51	19 56
15	7 03	20 03	6 46	20 19	6 27	20 38	7 07	20 17	7 28	20 58	6 17	19 59	6 52	20 57
16	8 04	21 01	7 49	21 16	7 31	21 33	8 09	21 15	8 31	21 54	7 20	20 56	7 55	21 52
17	9 04	21 54	8 50	22 07	8 34	22 21	9 09	22 07	9 32	22 45	8 22	21 46	8 58	22 41
18	10 00	22 43	9 49	22 53	9 36	23 04	10 06	22 56	10 30	23 32	9 21	22 31	10 00	23 24
19	10 53	23 29	10 45	23 35	10 36	23 42	11 00	23 40	11 26	—	10 18	23 13	10 59	—
20	11 43	—	11 38	—	11 33	—	11 50	—	12 18	0 14	11 13	23 51	11 55	0 02
21	12 30	0 11	12 29	0 14	12 28	0 17	12 39	0 21	13 09	0 53	12 05	—	12 50	0 38
22	13 16	0 52	13 19	0 51	13 21	0 50	13 26	1 01	13 58	1 31	12 55	0 27	13 43	1 12
23	14 02	1 31	14 08	1 28	14 14	1 23	14 13	1 39	14 47	2 08	13 45	1 03	14 35	1 45
24	14 48	2 11	14 56	2 04	15 06	1 56	15 00	2 18	15 35	2 45	14 35	1 38	15 27	2 19
25	15 34	2 52	15 46	2 42	15 59	2 31	15 47	2 58	16 24	3 23	15 25	2 15	16 19	2 54
26	16 22	3 34	16 35	3 22	16 51	3 08	16 35	3 40	17 14	4 03	16 15	2 54	17 11	3 31
27	17 10	4 18	17 26	4 04	17 43	3 47	17 24	4 23	18 04	4 45	17 06	3 36	18 03	4 11
28	18 00	5 04	18 16	4 49	18 35	4 30	18 14	5 09	18 54	5 30	17 56	4 40	18 54	4 55
29	18 49	5 53	19 06	5 36	19 24	5 17	19 03	5 57	19 44	6 18	18 46	5 08	19 43	5 42
30	19 38	6 43	19 54	6 26	20 12	6 08	19 52	6 47	20 32	7 08	19 34	5 58	20 31	6 32

N.B. —The L. M. T. thus obtained for the latitude of the place may now be converted into I.S.T. by inverse application of the local time correction for the place.

Moonrise and Moonset, 1999

Date	Local Mean Time of Moonrise & Moonset (Upper Limb)						Indian Standard Time of Moonrise & Moonset (Upper Limb)							
	Latitude						Chennai 13° N 4′		Mumbai 18° N 58′		Calcutta 22° N 35′		Delhi 28° N 39′	
	10°N0′		20°N0′		30°N0′									
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
July 1	20 26	7 34	20 40	7 18	20 56	7 01	20 40	7 38	21 19	8 00	20 20	6 50	21 16	7 26
2	21 13	8 25	21 25	8 12	21 38	7 57	21 26	8 30	22 03	8 53	21 04	7 44	21 58	8 21
3	21 59	9 16	22 08	9 06	22 18	8 54	22 11	9 22	22 47	9 47	21 46	8 39	22 38	9 17
4	22 44	10 07	22 50	10 00	22 56	9 52	22 55	10 15	23 29	10 41	22 27	9 34	23 16	10 15
5	23 29	10 59	23 31	10 55	23 33	10 51	23 39	11 07	—	11 36	23 07	10 30	23 54	11 14
6	—	11 51	—	11 51	—	11 51	—	12 00	0 10	12 31	23 48	11 27	—	12 13
7	0 15	12 44	0 13	12 48	0 11	12 53	0 23	12 55	0 53	13 28	—	12 25	0 32	13 14
8	1 02	13 40	0 56	13 48	0 50	13 57	1 10	13 52	1 37	14 27	0 31	13 26	1 13	14 18
9	1 52	14 38	1 43	14 50	1 32	15 03	1 59	14 51	2 24	15 29	1 16	14 28	1 56	15 23
10	2 46	15 39	2 33	15 53	2 19	16 09	2 52	15 53	3 15	16 32	2 06	15 33	2 43	16 29
11	3 43	16 41	3 28	16 57	3 11	17 16	3 48	16 56	4 10	17 36	3 00	16 37	3 35	17 35
12	4 43	17 44	4 27	18 00	4 08	18 19	4 48	17 58	5 08	18 39	3 58	17 40	4 33	18 39
13	5 45	18 44	5 29	19 00	5 10	19 18	5 50	18 58	6 11	19 38	5 00	18 40	5 35	19 37
14	6 46	19 41	6 31	19 54	6 14	20 10	6 51	19 54	7 13	20 33	6 03	19 34	6 39	20 30
15	7 45	20 33	7 33	20 44	7 18	20 56	7 51	20 45	8 14	21 23	7 05	20 23	7 42	21 16
16	8 41	21 21	8 31	21 29	8 20	21 38	8 47	21 33	9 12	22 08	8 04	21 07	8 44	21 58
17	9 33	22 06	9 27	22 10	9 20	22 15	9 41	22 16	10 08	22 49	9 01	21 47	9 43	22 36
18	10 23	22 48	10 20	22 49	10 17	22 50	10 32	22 57	11 01	23 28	9 55	22 25	10 40	23 11
19	11 11	23 29	11 12	23 26	11 13	23 23	11 20	23 37	11 51	—	10 48	23 02	11 34	23 45
20	11 57	—	12 01	—	12 06	23 57	12 08	—	12 41	0 06	11 38	23 38	12 27	—
21	12 43	0 09	12 51	0 03	12 59	—	12 55	0 16	13 30	0 43	12 29	—	13 20	0 19
22	13 30	0 49	13 40	0 41	13 52	0 31	13 42	0 56	14 19	1 21	13 19	0 14	14 12	0 54
23	14 17	1 31	14 30	1 20	14 44	1 07	14 30	1 37	15 08	2 01	14 09	0 52	15 04	1 30
24	15 05	2 14	15 20	2 01	15 37	1 45	15 19	2 20	15 58	2 42	15 00	1 33	15 56	2 09
25	15 54	3 00	16 10	2 44	16 28	2 27	16 08	3 04	16 48	3 26	15 50	2 16	16 48	2 51
26	16 44	3 47	17 00	3 31	17 19	3 12	16 58	3 52	17 38	4 13	16 40	3 03	17 38	3 37
27	17 33	4 37	17 49	4 21	18 08	4 02	17 47	4 41	18 28	5 02	17 30	3 52	18 27	4 26
28	18 22	5 28	18 37	5 13	18 54	4 55	18 36	5 33	19 15	5 54	18 17	4 44	19 13	5 19
29	19 11	6 20	19 23	6 06	19 37	5 50	19 24	6 25	20 02	6 48	19 02	5 38	19 57	6 14
30	19 57	7 12	20 07	7 01	20 18	6 48	20 10	7 18	20 46	7 42	19 46	6 33	20 33	7 12
31	20 43	8 04	20 50	7 56	20 57	7 46	20 54	8 11	21 29	8 37	20 27	7 29	21 18	8 10
Aug. 1	21 28	8 56	21 31	8 51	21 35	8 46	21 38	9 04	22 11	9 32	21 08	8 25	21 56	9 08
2	22 14	9 48	22 13	9 47	22 12	9 46	22 23	9 57	22 53	10 27	21 49	9 22	22 34	10 08
3	23 00	10 41	22 55	10 43	22 50	10 46	23 08	10 51	23 36	11 23	22 30	10 20	23 13	11 08
4	23 48	11 35	23 40	11 41	23 31	11 49	23 55	11 46	—	12 21	23 13	11 19	23 54	12 09
5	—	12 31	—	12 41	—	12 52	—	12 43	0 21	13 20	—	12 19	—	13 12
6	0 39	13 29	0 27	13 42	0 14	13 57	0 45	13 42	1 09	14 20	0 00	13 21	0 38	14 16
7	1 33	14 28	1 19	14 44	1 03	15 01	1 38	14 42	2 00	15 22	0 51	14 23	1 27	15 21
8	2 30	15 29	2 14	15 45	1 56	16 04	2 35	15 43	2 56	16 24	1 45	15 26	2 20	16 23
9	3 30	16 29	3 13	16 45	2 54	17 04	3 34	16 43	3 55	17 23	2 44	16 25	3 19	17 23
10	4 30	17 26	4 14	17 41	3 56	17 58	4 34	17 40	4 56	18 20	3 45	17 21	4 21	18 17
11	5 29	18 20	5 15	18 33	4 59	18 46	5 34	18 33	5 57	19 11	4 47	18 12	5 24	19 06
12	6 26	19 11	6 15	19 20	6 03	19 30	6 32	19 23	6 57	19 59	5 48	18 58	6 26	19 51
13	7 20	19 57	7 13	20 03	7 04	20 10	7 28	20 08	7 54	20 42	6 47	19 41	7 27	20 31
14	8 13	20 41	8 03	20 44	8 03	20 46	8 21	20 51	8 49	21 23	7 43	20 20	8 26	21 08
15	9 02	21 23	9 01	21 22	9 00	21 21	9 11	21 32	9 41	22 02	8 37	20 58	9 22	21 43

N.B. —The timings for 10°, 20° & 30° Lat. which are given in L.M.T. relate to the visibility of the upper limb of the Moon on the horizon of the Central Meridian of India ($82\frac{1}{2}$° E).

Moonrise and Moonset, 1999

Date	Local Mean Time of Moonrise & Moonset (Upper Limb)						Indian Standard Time of Moonrise & Moonset (Upper Limb)							
	Latitude						Chennai 13° N 4′		Mumbai 18° N 58′		Calcutta 22° N 35′		Delhi 28° N 39′	
	10° N 0′		20° N 0′		30° N 0′									
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*
Aug. 16	9 50	22 04	9 53	22 00	9 56	21 55	10 00	22 12	10 32	22 40	9 29	21 35	10 17	22 17
17	10 37	22 45	10 43	22 38	10 50	22 29	10 48	22 52	11 22	23 18	10 20	22 12	11 11	22 52
18	11 23	23 26	11 32	23 16	11 43	23 04	11 35	23 33	12 11	23 57	11 11	22 49	12 03	23 28
19	12 10	—	12 22	23 56	12 36	23 42	12 23	—	13 01	—	12 01	23 29	12 56	—
20	12 58	0 09	13 12	—	13 28	—	13 12	0 15	13 50	0 37	12 52	—	13 48	0 05
21	13 47	0 54	14 02	0 39	14 20	0 22	14 01	0 59	14 40	1 20	13 42	0 11	14 39	0 46
22	14 36	1 40	14 52	1 24	15 11	1 06	14 50	1 45	15 30	2 06	14 33	0 56	15 30	1 30
23	15 25	2 29	15 42	2 13	16 01	1 54	15 40	2 33	16 20	2 54	15 22	1 44	16 20	2 18
24	16 15	3 19	16 30	3 03	16 48	2 45	16 29	3 24	17 09	3 45	16 10	2 35	17 07	3 10
25	17 04	4 11	17 17	3 57	17 33	3 40	17 17	4 16	17 56	4 38	16 57	3 28	17 52	4 04
26	17 52	5 04	18 03	4 51	18 15	4 37	18 04	5 10	18 41	5 33	17 42	4 24	18 35	5 01
27	18 39	5 57	18 47	5 47	18 55	5 36	18 50	6 03	19 25	6 28	18 25	5 20	19 16	6 00
28	19 25	6 50	19 29	6 44	19 34	6 37	19 36	6 57	20 09	7 24	19 06	6 18	19 55	7 00
29	20 11	7 43	20 12	7 40	20 12	7 38	20 21	7 51	20 51	8 21	19 48	7 15	20 34	8 00
30	20 58	8 36	20 54	8 38	20 51	8 40	21 06	8 46	21 35	9 18	20 29	8 14	21 13	9 01
31	21 46	9 31	21 39	9 36	21 31	9 42	21 53	9 42	22 19	10 16	21 13	9 13	21 53	10 03
Sept. 1	22 36	10 26	22 25	10 35	22 13	10 46	22 42	10 38	23 06	11 15	21 58	10 13	22 37	11 06
2	23 28	11 23	23 15	11 36	23 00	11 49	23 34	11 36	23 56	12 15	22 47	11 15	23 24	12 10
3	—	12 22	—	12 37	23 50	12 54	—	12 36	—	13 15	23 40	12 16	—	13 13
4	0 24	13 21	0 08	13 37	—	13 56	0 28	13 35	0 50	14 16	—	13 18	0 15	14 15
5	1 21	14 20	1 05	14 36	0 46	14 55	1 20	14 34	1 47	15 15	0 36	14 17	1 10	15 14
6	2 20	15 17	2 03	15 32	1 45	15 50	2 24	15 31	2 45	16 11	1 35	15 12	2 09	16 09
7	3 18	16 11	3 03	16 24	2 46	16 40	3 23	16 24	3 45	17 03	2 35	16 04	3 11	16 59
8	4 15	17 02	4 02	17 12	3 48	17 24	4 20	17 14	4 44	17 51	3 35	16 51	4 12	17 44
9	5 10	17 49	5 00	17 57	4 50	18 05	5 16	18 01	5 41	18 36	4 33	17 35	5 13	18 25
10	6 02	18 34	5 56	18 38	5 49	18 42	6 10	18 44	6 37	19 17	5 30	18 15	6 12	19 03
11	6 52	19 17	6 50	19 17	6 47	19 18	7 01	19 26	7 30	19 57	6 25	18 53	7 10	19 39
12	7 41	19 58	7 42	19 55	7 44	19 52	7 51	20 07	8 22	20 35	7 18	19 31	8 05	20 14
13	8 29	20 40	8 33	20 33	8 39	20 26	8 39	20 47	9 13	21 14	8 10	20 08	9 00	20 49
14	9 16	21 21	9 24	21 12	9 33	21 01	9 28	21 28	10 03	21 52	9 02	20 45	9 53	21 24
15	10 03	22 04	10 14	21 52	10 26	21 38	10 16	22 09	10 53	22 33	9 53	21 24	10 46	22 01
16	10 51	22 47	11 04	22 33	11 19	22 17	11 04	22 52	11 42	23 14	10 43	22 05	11 39	22 41
17	11 39	23 33	11 54	23 17	12 11	22 59	11 53	23 37	12 32	23 59	11 34	22 49	12 31	23 23
18	12 28	—	12 44	—	13 02	23 45	12 42	—	13 22	—	12 24	23 35	13 22	—
19	13 17	0 20	13 33	0 04	13 52	—	13 31	0 25	14 11	0 45	13 13	—	14 11	0 09
20	14 06	1 10	14 22	0 53	14 40	0 34	14 20	1 14	15 00	1 35	14 02	0 24	14 59	0 59
21	14 54	2 00	15 09	1 45	15 25	1 27	15 08	2 05	15 47	2 27	14 49	1 16	15 45	1 52
22	15 42	2 52	15 55	2 39	16 09	2 23	15 55	2 58	16 33	3 20	15 34	2 11	16 28	2 47
23	16 30	3 45	16 39	3 34	16 50	3 22	16 42	3 51	17 18	4 15	16 18	3 07	17 10	3 45
24	17 17	4 38	17 23	4 31	17 29	4 22	17 28	4 45	18 02	5 11	17 00	4 04	17 50	4 45
25	18 04	5 32	18 06	5 28	18 08	5 23	18 14	5 40	18 45	6 09	17 42	5 03	18 29	5 46
26	18 51	6 26	18 49	6 26	18 47	6 26	19 00	6 36	19 29	7 07	18 25	6 02	19 09	6 48
27	19 40	7 22	19 34	7 26	19 28	7 30	19 48	7.32	20 15	8 06	19 09	7 03	19 50	7 52
28	20 31	8 19	20 21	8 27	20 10	8 36	20 37	8 30	21 02	9 06	19 54	8 04	20 34	8 56
29	21 24	9 17	21 11	9 28	20 56	9 42	21 29	9 30	21 52	10 07	20 43	9 07	21 20	10 02
30	22 19	10 16	22 04	10 31	21 47	10 47	22 24	10 30	22 46	11 09	21 36	10 10	22 11	11 07

N.B. —To calculate the times of Moonrise and Moonset for Calcutta and eastern India *subtract* 1 minute and for Delhi, Mumbai, Chennai etc. and western India *add* 1 minute to get the corrected L.M.T. for the required Meridian.

Moonrise and Moonset, 1999

Date	Local Mean Time of Moonrise & Moonset *(Upper Limb)*						Indian Standard Time of Moonrise & Moonset *(Upper Limb)*							
	Latitude													
	10° N 0′		20° N 0′		30° N 0′		Chennai 13° N 4′		Mumbai 18° N 58′		Calcutta 22° N 35′		Delhi 28° N 39′	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
Oct. 1	23 16	11 16	22 29	11 32	22 41	11 51	23 21	11 30	23 42	12 11	22 31	11 12	23 06	12 10
2	—	12 15	23 58	12 32	23 39	12 51	—	12 30	—	13 10	23 29	12 12	—	13 10
3	0 14	13 12	—	13 28	—	13 47	0 18	13 26	0 40	14 07	—	13 09	0 04	14 06
4	1 12	14 05	0 57	14 21	0 39	14 37	1 17	14 20	1 39	14 59	0 28	14 01	1 04	14 57
5	2 09	14 57	1 55	15 09	1 40	15 22	2 14	15 10	2 37	15 48	1 27	14 48	2 04	15 42
6	3 03	15 45	2 52	15 53	2 41	16 03	3 09	15 57	3 34	16 32	2 25	15 32	3 04	16 24
7	3 55	16 30	3 48	16 35	3 40	16 41	4 02	16 40	4 29	17 14	3 22	16 12	4 03	17 02
8	4 45	17 12	4 42	17 14	4 37	17 16	4 53	17 22	5 22	17 54	4 16	16 51	5 00	17 38
9	5 34	17 54	5 34	17 52	5 34	17 50	5 43	18 03	6 14	18 32	5 10	17 28	5 56	18 12
10	6 22	18 35	6 25	18 30	6 29	18 24	6 32	18 43	7 05	19 10	6 02	18 05	6 50	18 47
11	7 09	19 16	7 16	19 08	7 24	18 59	7 20	19 23	7 55	19 49	6 53	18 42	7 44	19 22
12	7 56	19 58	8 06	19 47	8 18	19 35	8 09	20 04	8 45	20 28	7 45	19 20	8 38	19 58
13	8 44	20 42	8 57	20 28	9 11	20 13	8 57	20 47	9 35	21 09	8 36	20 01	9 31	20 37
14	9 32	21 27	9 47	21 11	10 04	20 54	9 46	21 31	10 25	21 53	9 26	20 43	10 23	21 18
15	10 20	22 13	10 37	21 57	10 55	21 38	10 35	22 17	11 15	22 38	10 17	21 23	11 14	22 02
16	11 09	23 01	11 26	22 44	11 45	22 25	11 23	23 05	12 04	23 26	11 05	22 16	12 04	22 50
17	11 57	23 51	12 14	23 34	12 33	23 16	12 12	23 55	12 52	—	11 54	23 06	12 52	23 40
18	12 46	—	13 01	—	13 19	—	12 59	—	13 39	0 16	12 41	23 58	13 38	—
19	13 33	0 41	13 46	0 26	14 02	0 10	13 46	0 46	14 25	1 08	13 26	—	14 21	0 34
20	14 20	1 32	14 31	1 20	14 43	1 06	14 32	1 38	15 09	2 01	14 09	0 52	15 03	1 30
21	15 06	2 24	15 14	2 15	15 22	2 04	15 18	2 31	15 53	2 56	14 52	1 48	15 43	2 28
22	15 53	3 17	15 57	3 11	16 01	3 05	16 03	3 25	16 36	3 52	15 34	2 45	16 22	3 28
23	16 40	4 11	16 40	4 09	16 40	4 07	16 49	4 20	17 20	4 50	16 16	3 44	17 01	4 29
24	17 28	5 07	17 24	5 09	17 20	5 11	17 37	5 16	18 05	5 49	16 59	4 45	17 42	5 33
25	18 19	6 04	18 11	6 10	18 02	6 17	18 25	6 15	18 52	6 50	17 45	5 47	18 25	6 38
26	19 13	7 03	19 01	7 13	18 48	7 25	19 19	7 15	19 43	7 52	18 34	6 51	19 12	7 45
27	20 09	8 04	19 55	8 18	19 38	8 33	20 14	8 18	20 36	8 57	19 27	7 57	20 02	8 53
28	21 08	9 05	20 52	9 22	20 33	9 40	21 13	9 20	21 34	10 01	20 23	9 02	20 58	10 00
29	22 08	10 06	21 51	10 25	21 31	10 44	22 12	10 22	22 33	11 03	21 22	10 05	21 56	11 03
20	23 07	11 08	22 51	11 24	22 32	11 43	23 12	11 22	23 33	12 02	22 22	11 04	22 57	12 02
31	—	12 04	23 50	12 19	23 34	12 36	—	12 17	—	12 57	23 22	11 59	23 58	12 55
Nov. 1	0 05	12 56	—	13 08	—	13 23	0 10	13 09	0 32	13 47	—	12 48	—	13 43
2	1 00	13 44	0 48	13 54	0 35	14 05	1 06	13 56	1 30	14 32	0 21	13 32	0 59	14 25
3	1 52	14 27	1 44	14 35	1 34	14 43	1 59	14 40	2 25	15 14	1 17	14 13	1 57	15 03
4	2 42	15 11	2 37	15 15	2 32	15 18	2 50	15 22	3 18	15 54	2 12	14 51	2 54	15 39
5	3 30	15 53	3 29	15 52	3 28	15 52	3 39	16 02	4 09	16 32	3 05	15 28	3 50	16 13
6	4 18	16 33	4 20	16 29	4 23	16 25	4 28	16 41	5 00	17 09	3 56	16 04	4 44	16 47
7	5 05	17 14	5 10	17 07	5 17	16 59	5 16	17 21	5 50	17 47	4 48	16 41	5 38	17 21
8	5 52	17 55	6 00	17 45	6 11	17 34	6 04	18 02	6 39	18 26	5 39	17 18	6 31	17 57
9	6 39	18 38	6 51	18 25	7 04	18 11	6 52	18 43	7 29	19 06	6 30	17 58	7 24	18 34
10	7 27	19 22	7 41	19 07	7 57	18 50	7 40	19 27	8 19	19 49	7 21	18 39	8 17	19 14
11	8 15	20 08	8 31	19 52	8 49	19 33	8 29	20 13	9 09	20 34	8 11	19 23	9 09	19 58
12	9 04	20 55	9 21	20 39	9 40	20 19	9 18	21 00	9 59	21 20	9 01	20 10	9 59	20 44
13	9 52	21 44	10 09	21 28	10 29	21 08	10 07	21 49	10 47	22 08	9 50	20 59	10 48	21 33
14	10 40	22 34	10 56	22 18	11 15	22 00	10 54	22 33	11 34	23 00	10 36	21 50	11 34	22 25
15	11 27	23 24	11 41	23 10	11 58	22 54	11 40	23 28	12 20	23 51	11 21	22 42	12 17	23 17

N.B.—From the corrected L.M.T. calculate for the exact latitude of the place by interpolation when the place is between 10° N. and 30° N. and by extrapolation when the place falls outside 10° N. or 30° N. Lat.

Moonrise and Moonset, 1999

Date	Local Mean Time of Moonrise & Moonset *(Upper Limb)*						Indian Standard Time of Moonrise & Moonset *(Upper Limb)*							
	Latitude						Chennai 13° N 4′		Mumbai 18° N 58′		Calcutta 22° N 35′		Delhi 28° N 39′	
	10° N 0′		20° N 0′		30° N 0′									
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*	*h m*
Nov. 16	12 13	—	12 25	—	12 39	23 50	12 25	—	13 03	—	12 04	23 36	12 58	—
17	12 58	0 14	13 07	0 03	13 18	—	13 10	0 20	13 46	0 44	12 45	—	13 38	0 14
18	13 43	1 05	13 48	0 57	13 55	0 48	13 54	1 12	14 28	1 38	13 26	0 31	14 16	1 11
19	14 28	1 56	14 30	1 52	14 33	1 48	14 38	2 05	15 10	2 33	14 07	1 27	14 54	2 10
20	15 15	2 50	15 13	2 49	15 11	2 49	15 23	2 59	15 53	3 30	14 48	2 25	15 33	3 11
21	16 04	3 45	15 58	3 49	15 51	3 53	16 11	3 55	16 38	4 29	15 32	3 26	16 14	4 15
22	16 56	4 43	16 46	4 51	16 35	5 00	17 02	4 55	17 27	5 30	16 19	4 29	16 58	5 21
23	17 52	5 44	17 38	5 56	17 23	6 09	17 57	5 57	18 20	6 35	17 11	5 34	17 47	6 29
24	18 51	6 47	18 35	7 02	18 17	7 19	18 56	7 01	19 17	7 41	18 07	6 42	18 42	7 39
25	19 53	7 51	19 36	8 08	19 16	8 27	19 57	8 06	20 18	8 47	19 07	7 48	19 41	8 47
26	20 55	8 55	20 38	9 12	20 19	9 31	21 00	9 09	21 20	9 50	20 09	8 52	20 44	9 51
27	21 56	9 55	21 41	10 11	21 23	10 29	22 01	10 09	22 23	10 49	21 12	9 51	21 48	10 48
28	22 54	10 50	22 41	11 04	22 26	11 20	22 59	11 04	23 23	11 43	22 13	10 44	22 51	11 40
29	23 48	11 41	23 39	11 52	23 28	12 05	23 55	11 54	—	12 31	23 12	11 31	23 51	12 25
30	—	12 23	—	12 36	—	12 45	—	12 40	0 20	13 15	—	12 14	—	13 05
Dec. 1	0 40	13 12	0 34	13 16	0 27	13 21	0 47	13 22	1 14	13 55	0 08	12 53	0 49	13 42
2	1 29	13 53	1 26	13 54	1 23	13 55	1 37	14 03	2 06	14 34	1 01	13 30	1 45	14 16
3	2 16	14 34	2 17	14 31	2 18	14 28	2 26	14 42	2 57	15 11	1 53	14 06	2 40	14 50
4	3 03	15 14	3 07	15 08	3 12	15 01	3 13	15 21	3 47	15 48	2 44	14 42	3 33	15 23
5	3 49	15 54	3 57	15 45	4 06	15 35	4 01	16 01	4 36	16 26	3 35	15 19	4 26	15 56
6	4 36	16 36	4 47	16 24	4 59	16 11	4 48	16 42	5 25	17 05	4 25	15 57	5 19	16 34
7	5 23	17 20	5 37	17 05	5 52	16 49	5 37	17 25	6 15	17 47	5 16	16 38	6 12	17 13
8	6 12	18 05	6 27	17 49	6 45	17 31	6 25	18 10	7 05	18 31	6 07	17 21	7 04	17 55
9	7 00	18 52	7 17	18 35	7 36	18 16	7 15	18 56	7 55	19 17	6 57	18 06	7 55	18 40
10	7 49	19 40	8 06	19 23	8 26	19 04	8 03	19 45	8 44	20 05	7 47	18 55	8 45	19 29
11	8 37	20 30	8 54	20 13	9 13	19 55	8 51	20 34	9 32	20 55	8 34	19 45	9 32	20 19
12	9 24	21 19	9 39	21 05	9 57	20 48	9 38	21 24	10 18	21 46	9 19	20 36	10 16	21 12
13	10 10	22 09	10 22	21 56	10 38	21 43	10 23	22 14	11 01	22 38	10 03	21 29	10 56	22 06
14	10 54	22 58	11 05	22 49	11 17	22 38	11 07	23 05	11 43	23 30	10 44	22 22	11 37	23 02
15	11 38	23 48	11 45	23 42	11 54	23 35	11 49	23 55	12 24	—	11 23	23 16	12 14	23 58
16	12 21	—	12 25	—	12 30	—	12 32	—	13 04	0 23	12 02	—	12 51	—
17	13 05	0 38	13 06	0 36	13 06	0 34	13 15	0 47	13 45	1 17	12 42	0 11	13 27	0 56
18	13 51	1 30	13 48	1 32	13 43	1 34	13 59	1 40	14 28	2 12	13 23	1 08	14 06	1 56
19	14 40	2 25	14 32	2 31	14 24	2 37	14 47	2 36	15 13	3 10	14 06	2 08	14 47	2 58
20	15 33	3 23	15 21	3 32	15 08	3 43	15 38	3 35	16 02	4 11	14 54	3 10	15 32	4 04
21	16 29	4 24	16 15	4 37	15 58	4 52	16 34	4 37	16 57	5 16	15 47	4 16	16 23	5 12
22	17 30	5 27	17 14	5 43	16 55	6 01	17 35	5 41	17 56	6 22	16 45	5 23	17 19	6 21
23	18 34	6 32	18 16	6 49	17 57	7 09	18 38	6 47	18 59	7 28	17 47	6 30	18 22	7 28
24	19 38	7 36	19 21	7 53	19 02	8 12	19 42	7 50	20 03	8 31	18 52	7 33	19 27	8 31
25	20 39	8 36	20 25	8 51	20 09	9 09	20 44	8 50	21 07	9 30	19 57	8 31	20 33	9 28
26	21 38	9 32	21 27	9 44	21 14	9 58	21 44	9 45	22 08	10 23	20 59	9 23	21 38	10 18
27	22 32	10 22	22 25	10 31	22 16	10 42	22 39	10 34	23 06	11 10	21 58	10 10	22 39	11 02
28	23 24	11 05	23 20	11 14	23 15	11 21	23 32	11 18	—	11 53	22 54	10 52	23 38	11 41
29	—	11 52	—	11 54	—	11 56	—	12 02	0 02	12 33	23 46	11 30	—	12 18
30	0 13	12 33	0 12	12 32	0 12	12 30	0 22	12 42	0 52	13 11	—	12 07	0 34	12 52
31	1 00	13 13	1 03	13 09	1 07	13 03	1 10	13 21	1 43	13 49	0 40	12 43	1 28	13 25
32	1 47	13 54	1 53	13 46	2 01	13 37	1 58	14 01	2 32	14 26	1 31	13 20	2 22	14 00

N.B.—The L.M.T. thus obtained for the latitude of the place may now be converted into I.S.T. by inverse application of the local time correction for the place.

Method for Calculation of Sunrise, Sunset and Moonrise, Moonset times from the Tables given in this Ephemeris.

Sunrise & Sunset

Example : To find the times of Sunrise and Sunset in I.S.T at **Haridwar** on March 21, 1999 from the table of Local Mean Time of Sunrise & Sunset

Haridwar : Latitude = 29° N 56' = 20°+ 9° 56' = 20°+ 9°.93
Interpolation factor for the Latitude = .993 for 1° difference
Longitude = 78° E 08'
Correction to obtain I.S.T. from L.M.T = + 17*m* 28*s*

The latitude of Haridwar is 29° N 56' which lies between 20° & 30° North Lat.

Sunrise in L.M.T.

Latitude	+ 20°	+ 30°	*Diff.*
March 21 =	$6^h\ 04^m$	$6^h\ 03^m$	-1^m

Sunset in L.M.T.

Latitude	+ 20°	+ 30°	*Diff.*
March 21 =	$18^h\ 11^m$	$18^h\ 12^m$	$+1^m$

The time of Sunrise and Sunset in for Lat. 29°N 56' on Mar. 21 would be as follows.

Sunrise in L.M.T.	= $6^h\ 04^m$ (–) (.993 × 1^m)	
	= $6^h\ 04^m - 0^m.99$	= $6^h\ 03^m.0$
Corr. to obtain I. S. T		= (+) $17^m.5$
Sunrise in I. S. T. (upper limb)		= **$6^h\ 20^m.5$**
(rounded to minute)		= **$6^h\ 21^m$**

Sunset in L.M.T.	= $18^h\ 11^m$ (+) (.993 × 1^m)	
	= $18^h\ 11^m + 1^m.0$	= $18^h\ 12^m.0$
Corr. to obtain I. S. T		= (+) $17^m.5$
Sunset in I. S. T. (upper limb)		= ***$18^h\ 29^m.5$***
(rounded to minute)		= **$18^h\ 30^m$**

Moonrise & Moonset

Example : To find the times of Moonrise and Moonset in I.S.T at **Delhi** on June 21, 1999 from the table of Local Mean Time of Moonrise & Moonset

Delhi : Latitude = 28° N 39' = 20°+ 8° 39' = 20°+ $8^m.65$
Interpolation factor for the Latitude = .865 for 1° difference
Longitude = 77° E 13'
Correction to obtain I.S.T. from L.M.T = + 21*m* 08*s*

The latitude of Delhi is 28° N 39' which falls between 20° & 30° North Lat.

The time of Moonrise and Moonset for Lat. 28°N 39' on June 21 would be as follows.

Moonrise in L.M.T.

Latitude	+ 20°	+ 30°	*Diff.*
June 21 =	$11^h\ 38^m$	$11^h\ 33^m$	-5^m

Time of Moonrise in L. M. T. for Lat. 28° 39'		
	= $11^h\ 38^m$ (–) (.865 × 5^m)	
	= $11^h\ 38^m - 4^m.3$	= $11^h\ 33^m.7$
Corr. to obtain I. S. T		= + $21^m.1$
* Corr. for long. 77°E 13'		= + $1^m.0$
Moonrise in I. S. T. (upper limb)		= **$11^h\ 55^m.8$**
(rounded to minute)		= **$11^h\ 56^m$**

Moonset in L.M.T.

+ 20°	+ 30°	*Diff.*
$24^h\ 14^m$	$24^h\ 17^m$	$+3^m$

Time of Moonset in L. M. T. for Lat. 28° 39'		
	= $24^h\ 14^m$ (+) (.865 × 3^m)	
	= $24^h\ 14^m + 2^m.6$	= $24^h\ 16^m.6$
Corr. to obtain I. S. T		= + $21^m.1$
* Corr. for long. 77°E 13'		= + $1^m.0$
Moonset in I. S. T. (upper limb)		= ***$24^h\ 38^m.7$***
(rounded to minute)		= **$24^h\ 39^m$**

* For greater accuracy a correction of 1 minute for the Meridian of the place is required to be taken and the same is to be *subtracted* for places in eastern India and 1 minute to be *added* for places in western India.

Method for finding out Ascendant (Lagna) and Planets' Positions of a Foreign city

Example :	Date	:	23rd September, 1999, Thursday
	Time	:	19*h* 31*m*.(Local or Zonal Standard Time)
	Place	:	Singapore
			Latiude 1°21' North; Longitude 103°54' East

Local or Zonal Standard Time	=	19*h* 31*m*
L.M.T. (correction is –34*m* 24*s*)	=	19*h* 31*m* (–) 34*m* 24*s*
	=	18*h* 56*m* 36*s*
I.S.T. = (Z.S.T. – 2*h* 30*m*)	=	19*h* 31*m* (–) 2*h* 30*m* = 17*h* 01*m*

When the place is East of Greenwich, the L.M.T.of the moment will be more than G.M.T. by the time equivalent of the longitude of the place. In finding the Sidereal Time and Ascendant of any moment, the Local mean time is to be used while for finding the position of the Moon and planets I.S.T is to be used.

The procedure for obtaining Ascendant from the book *Tables of Ascendants* by N.C.Lahiri is shown below.

The L. M. T of the moment is 18*h* 56*m* 36*s* which is 6*h* 56*m* 36*s* after 12*h* Noon. The time interval of 6*h* 56*m* 36*s* from 12*h* Noon increased by 10 seconds per hour (= + 1*m* 9*s*) becomes 6*h* 57*m* 45*s*.

Sidereal Time on 23rd September at 12*h* Noon (from Ephemeris)	=	12*h* 6*m* 42*s*
Correction to Indian Sidereal Time for the place Singapore	=	– 0*m* 14*s*
	=	12*h* 6*m* 28*s*
Increased time interval from Noon	=	+ 6*h* 57*m* 45*s*
Adding, we get Sidereal Time for the moment	=	19*h* 04*m* 13*s*

Ascendant— The latitude being 1°21' North, the Table for 2°0' North (which is meant for Singapore and nearest to 1°21' N is to be used, *vide* p.10)

Now from the book *Tables of Ascendants,* using the Table for 2°0' N, according to Sidereal Time 19*h* 04*m* 13*s*, the Ascendant comes out as 11^S 24° 40'. Applying *Ayanamsa* correction of (–) 51, we get the Ascendant as 11^S 23°49' *i.e. Mina* 23° 49'.

Tenth House : From the Table of Tenth House of the same book, according to same Sidereal Time *viz,*19*h* 04*m* 13*s*, the Tenth House is obtained after applying Ayanamsa correctaion of –51' as 8^S20°56' *i.e.* ***Dhanus 20°56'.***

Moon and Planets : The position of Moon and planets is to be calculated for 17*h* 01*m* I.S.T., as per procedure shown in the example at the end of the Table of Logarithms. The longitude of Moon is, however, found to be 10^S11°1' *(Kumbha 11°1').*

Local Mean Time of Beginning of Lagnas, 1999

For the Central Station of India

(Subtract 4 mins. per day after the given date)

Date	Mesha	Vrisha	Mithuna	Karkata	Simha	Kanya	Tula	Vrischika	Dhanus	Makara	Kumbha	Mina
Jan. 0	12 34	14 14	16 12	18 25	20 42	22 53	25 04	3 23	5 39	7 44	9 31	11 04
15	11 35	13 15	15 13	17 26	19 43	21 54	24 05	2 24	4 40	6 45	8 32	10 05
Feb. 0	10 32	12 12	14 10	16 23	18 40	20 52	23 02	1 21	3 37	5 42	7 29	9 02
15	9 33	11 13	13 11	15 24	17 41	19 53	22 03	24 18	2 38	4 43	6 30	8 03
Mar. 1	8 38	10 18	12 16	14 29	16 46	18 58	21 08	23 23	1 43	3 48	5 35	7 08
16	7 39	9 19	11 17	13 30	15 47	17 59	20 09	22 24	24 40	2 49	4 36	6 09
Apr. 1	6 36	8 16	10 14	12 28	14 44	16 56	19 06	21 21	23 37	1 46	3 33	5 06
16	5 37	7 17	9 15	11 29	13 45	15 57	18 07	20 22	22 38	24 43	2 34	4 07
May 1	4 39	6 18	8 16	10 30	12 46	14 58	17 08	19 23	21 39	23 44	1 35	3 08
16	3 40	5 19	7 17	9 31	11 47	13 59	16 09	18 24	20 40	22 45	24 32	2 09
June 1	2 37	4 17	6 14	8 28	10 44	12 56	15 07	17 21	19 37	21 43	23 29	1 06
16	1 38	3 18	5 15	7 29	9 45	11 57	14 08	16 22	18 38	20 44	22 30	24 03
July 1	24 35	2 19	4 17	6 30	8 46	10 58	13 09	15 23	17 39	19 45	21 32	23 04
16	23 36	1 20	3 18	5 31	7 47	9 59	12 10	14 24	16 40	18 46	20 33	22 05
Aug. 1	22 33	24 13	2 15	4 28	6 44	8 56	11 07	13 21	15 37	17 43	19 29	21 02
16	21 34	23 14	1 16	3 29	5 45	7 57	10 08	12 22	14 38	16 44	18 30	20 03
Sept. 1	20 31	22 11	24 09	2 26	4 42	6 54	9 05	11 19	13 36	15 41	17 28	19 01
16	19 32	21 12	23 10	1 27	3 43	5 55	8 06	10 20	12 37	14 42	16 29	18 02
Oct. 1	18 33	20 13	22 11	24 24	2 44	4 56	7 07	9 22	11 38	13 43	15 30	17 03
16	17 34	19 14	21 12	23 25	1 45	3 57	6 08	8 23	10 39	12 44	14 31	16 04
Nov. 1	16 31	18 11	20 09	22 22	24 38	2 54	5 05	7 20	9 36	11 41	13 28	15 01
16	15 32	17 12	19 10	21 23	23 39	1 55	4 06	6 21	8 37	10 42	12 29	14 02
Dec. 1	14 33	16 13	18 11	20 24	22 40	24 52	3 07	5 22	7 38	9 43	11 30	13 03
16	13 34	15 14	17 12	19 25	21 41	23 53	2 08	4 23	6 39	8 44	10 31	12 04
31	12 35	14 15	16 12	18 26	20·43	22 54	1 09	3 24	5 40	7 45	9 32	11 05

Add 1 min. for 180° E. Longitude, no correction for 90° E. Long. and *subtract* 1 min. for 0° Long. and 2 mins. for 90° W. Long.

Correction to the above L. M. T. for latitude of place .

Latitude	Mesha	Vrisha	Mithuna	Karkata	Simha	Kanya	Tula	Vrischika	Dhanus	Makara	Kumbha	Mina
+60°	−48	−109	−149	−132	−76	−14	+48	+109	+149	−132	+76	+14
50	−27	−61	−80	−73	−44	−8	+27	+61	+80	+73	+44	+8
40	−14	−32	−41	−38	−23	−4	+14	+32	+41	+38	+23	+4
30	−5	−11	−14	−13	−8	−1	+5	+11	+14	+13	+8	+1
23.2	0	0	0	0	0	0	0	0	0	0	0	0
20	+3	+6	+7	+6	+4	+1	−3	−6	−7	−6	−4	−1
+10	+10	+21	+26	+23	+14	+3	−10	−21	−26	−23	−14	−3
0	+17	+35	+44	+39	+24	+5	−17	−35	−44	−39	−24	−5
−10	+24	+49	+62	+55	+34	+7	−24	−49	−62	−55	−34	−7
−20	+31	+64	+81	+72	+44	+9	−31	−64	−81	−72	−44	−9
−30	+39	+81	+102	+91	+56	+11	−39	−81	−102	−91	−56	−11
−40	+48	+102	+129	+116	+71	+14	−48	−102	−129	−116	−71	−14

Correction Tables for the Beginning of Lagnas

The corrections given in the following table for certain cities in India when applied to the time of beginning of the Lagna (Ascendant) given on the previous page would give the beginning time of that Lagna in I. S. T. at the station.

Place	Mesha	Vrisha	Mithuna	Karkata	Simha	Kanya	Tula	Vrischika	Dhanus	Makara	Kumbha	Mina
	m	m	m	m	m	m	m	m	m	m	m	m
Agartala	–36	–36	–37	–36	–36	–35	–35	–34	–34	–34	–35	–35
Ahmedabad	+40	+40	+40	+40	+40	+40	+40	+40	+39	+39	+40	+40
Allahabad	+1	–1	–2	–2	–0	+2	+4	+6	+7	+7	+5	+3
Bangalore	+27	+35	+39	+38	+31	+22	+12	+4	0	+2	+9	+18
Bhopal	+20	+20	+20	+20	+20	+20	+20	+20	+21	+21	+20	+20
Bhubaneswar	–11	–9	–7	–8	–10	–13	–16	–18	–19	–19	–17	–14
Calcutta	–23	–23	–22	–22	–23	–23	–24	–24	–25	–25	–24	–24
Chandigarh	+16	+9	+6	+7	+13	+21	+29	+35	+39	+38	+32	+24
Chennai	+16	+24	+29	+27	+20	+11	+2	–6	–11	–9	–2	+7
Cuttack	–11	–9	–8	–9	–10	–13	–15	–18	–19	–18	–17	–14
Delhi	+17	+12	+9	+10	+15	+20	+25	+31	+33	+32	+28	+22
Guwahati	–39	–42	–43	–43	–40	–38	–35	–32	–31	–31	–33	–36
Hyderabad	+20	+25	+28	+27	+23	+17	+12	+7	+5	+6	+10	+15
Jaipur	+24	+21	+19	+19	+22	+26	+30	+33	+35	+34	+31	+28
Kanchipuram	+19	+27	+31	+29	+22	+13	+4	–4	–9	–7	0	+8
Lucknow	+3	0	–2	–1	+2	+5	+9	+12	+14	+13	+11	+7
Mumbai	+42	+45	+47	+46	+43	+40	+36	+32	+30	+31	+34	+38
Mysore	+31	+40	+45	+43	+35	+26	+16	+8	+3	+4	+12	+21
Nagpur	+15	+17	+18	+17	+16	+14	+12	+10	+10	+10	+11	+13
Panjim	+40	+47	+50	+49	+43	+36	+29	+23	+20	+21	+26	+33
Patna	–12	–15	–16	–15	–13	–11	–9	–7	–5	–6	–8	–10
Pondicherry	+19	+28	+32	+30	+23	+13	+3	–6	–11	–9	–2	+8
Pune	+38	+42	+44	+43	+40	+35	+31	+27	+25	+26	+29	+33
Puri	–11	–8	–7	–7	–10	–13	–16	–19	–20	–20	–17	–14
Rajahmundry	+7	+12	+15	+14	+10	+4	–2	–7	–9	–8	–4	+2
Srinagar	+22	+11	+6	+8	+17	+28	+41	+51	+56	+54	+45	+34
Tirupati	+19	+27	+31	+29	+23	+14	+6	–2	–6	–5	+2	+11
Trivandram	+32	+44	+50	+47	+38	+25	+12	0	–6	–3	+6	+20
Ujjain	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27
Varanasi	–4	–6	–7	–6	–5	–2	0	+2	+3	+2	+1	–2
Vijayawada	+12	+18	+21	+19	+15	+9	+3	–3	–6	–5	0	+6

Foreign Cities

The following time corrections to the beginning of Lagnas would give the Local (Zonal) Standard Time of the beginning of the Lagna at the given place.

Place	Mesha	Vrisha	Mithuna	Karkata	Simha	Kanya	Tula	Vrischika	Dhanus	Makara	Kumbha	Mina
	m	m	m	m	m	m	m	m	m	m	m	m
Beijing	+1	–17	–26	–23	–8	+11	+28	+47	+55	+52	+37	+19
Cairo	–11	–17	–20	–19	–14	–7	–1	+5	+8	+7	+2	–5
Canberra	+49	+97	+121	+109	+69	+17	–39	–87	–112	–100	–59	–8
Colombo	+23	+36	+42	+38	+28	+14	–2	–15	–21	–17	–7	+7
Dhaka	–2	–2	–3	–3	–2	–2	–1	–1	–1	–1	–1	–2
Geneva	+12	–16	–31	–25	–2	+28	+56	+84	+100	+94	+70	+41
London	–31	–69	–91	–83	–50	–10	+30	+68	+90	+81	+48	+8
Moscow	–10	–60	–91	–78	–34	+17	+68	+117	+148	+135	+91	+40
Paris	+24	–8	–26	–19	+8	+42	+75	+107	+125	+119	+91	+57
Islamabad	–1	–11	–16	–14	–6	+6	+16	+26	+31	+30	+21	+10
Tokyo	–28	–41	–47	–45	–34	–20	–8	+5	+12	+10	–1	–15
Washington D.C.	–6	–23	–31	–29	–15	+3	+20	+36	+45	+42	+28	+10

Tables of Ascendants *(Nirayana)*

The following tables give the ASCENDANT *(Lagna)* for 12 places and the TENTH HOUSE for all places at an interval of 10° degree according to the *Nirayana* system, when the Sidereal Time for the given moment is known. The tables, which are prepared for the year 1999, may be utilised for a few years past and future without entailing any appreciable amount of error. These tables are applicable for all places on the earth lying on the same geographic latitudes as given below. It must be noted that in finding the Sidereal time for a moment, the *local mean time* should be used and not the standard time. For finding out the Ascendant of other places, the book *Tables of Ascendants* by N. C. Lahiri may be used. An example showing the procedure for finding out the *Lagna* (Ascendant) and *Dasama* (Tenth House) for a place is shown on the next page.

TENTH HOUSE OR ASCENDANT		Tenth House for all places	ASCENDANT FOR					
			Colombo 6°N 54'	Chennai 13°N 04' Bangalore 12°N 58'	Rangoon 16°N 47'	Mumbai 18°N 58'	Calcutta 22°N 35'	
		SIDEREAL TIME						
s	°	h m s	h m s	h m s	h m s	h m s	h m s	°
0 Mesha	0	1 28 18	19 23 43	19 19 36	19 16 53	19 15 30	19 12 44	0
	10	2 06 22	19 59 59	19 54 24	19 50 27	19 48 27	19 44 41	10
	20	2 45 35	20 37 26	20 30 14	20 25 21	20 22 50	20 18 10	20
1 Vrisha	0	3 25 51	21 16 19	21 07 44	21 02 03	20 59 00	20 53 25	0
	10	4 07 21	21 56 35	21 47 00	21 40 31	21 37 07	21 30 46	10
	20	4 49 56	22 38 17	22 27 54	22 20 53	22 17 10	22 10 14	20
2 Mithuna	0	5 33 13	23 21 04	23 10 13	23 02 56	22 59 04	22 51 55	0
	10	6 16 47	0 04 34	23 53 39	23 46 22	23 42 30	23 35 22	10
	20	7 00 09	0 48 22	0 37 47	0 30 50	0 27 08	0 20 00	20
3 Karkata	0	7 42 55	1 31 ·57	1 22 00	1 15 31	1 12 00	1 05 27	0
	10	8 24 39	2 14 47	2 05 55	2 00 04	1 57 00	1 51 09	10
	20	9 05 15	2 56 49	2 49 21	2 44 14	2 41 34	2 36 41	20
4 Simha	0	9 44 39	3 37 51	3 31 46	3 27 43	3 25 34	3 21 38	0
	10	10 22 59	4 17 59	4 13 32	4 10 34	4 08 56	4 06 00	10
	20	11 00 29	4 57 19	4 54 32	4 52 42	4 51 43	4 49 51	20
5 Kanya	0	11 37 22	5 36 11	5 35 11	5 34 25	5 34 04	5 33 22	0
	10	12 14 06	6 14 52	6 15 31	6 16 00	6 16 12	6 16 39	10
	20	12 50 55	6 53 37	6 56 03	6 57 42	6 58 34	7 00 04	20
6 Tula	0	13 28 18	7 32 51	7 37 03	7 39 42	7 41 12	7 43 41	0
	10	14 06 21	8 12 47	8 18 33	8 22 21	8 24 21	8 28 09	10
	20	14 45 35	8 53 31	9 00 46	9 05 39	9 08 12	9 12 55	20
7 Vriscika	0	15 25 51	9 35 26	9 44 00	9 49 42	9 52 44	9 58 18	0
	10	16 07 21	10 18 09	10 27 47	10 34 13	10 37 41	10 43 59	10
	20	16 49 56	11 01 34	11 12 00	11 18 56	11 22 40	11 29 32	20
8 Dhanus	0	17 33 13	11 45 18	11 56 08	12 03 26	12 07 21	12 14 31	0
	10	18 16 47	12 28 56	12 39 46	12 47 08	12 51 03	11 58 13	10
	20	19 00 08	13 51 59	13 22 29	13 29 35	13 33 17	13 40 19	20
9 Makara	0	19 42 56	13 53 53	14 03 43	14 10 23	14 13 51	14 20 23	0
	10	20 24 40	14 34 31	14 43 23	14 49 15	14 52 22	14 58 14	10
	20	21 05 15	15 13 41	15 21 14	15 25 42	15 28 56	15 33 53	20
10 Kumbha	0	21 44 39	15 51 29	15 57 31	16 01 38	16 03 46	16 07 43	0
	10	22 22 59	16 28 00	16 32 31	16 35 29	16 37 03	16 40 00	10
	20	23 00 29	17 03 38	17 06 27	17 08 16	17 09 16	17 11 34	20
11 Mina	0	23 37 25	17 38 38	17 39 43	17 40 26	17 40 48	17 41 27	0
	10	0 14 06	18 13 28	18 12 48	18 12 16	18 12 00	18 11 36	10
	20	0 51 03	18 48 17	18 45 53	18 44 16	18 43 25	18 41 51	20
	30	1 28 18	19 23 43	19 19 36	19 16 53	19 15 28	19 12 44	30

Tables of Ascendants *(Nirayana)—contd.*

Example : To find the Ascendant *(Lagna)* and Tenth House *(Dasama)* for ***Allahabad*** (Lat. 25°N 28', Log. 81°E 52') on 21st March, 7*h* 16*m* a.m. I.S.T. (Time of transit of tropical Sun to Aries). The time in L.M.T. of the place is I.S.T. (–) 2*m* 32*s*. So the given time in L.M.T. is 7*h* 13*m* 28*s* a.m. of 21st March. The given time occurs 4*h* 46*m* 32*s* before Noon of 21st March. Sidereal Time on 21st March, 1999 at 12*h* Noon is 23*h* 53*m* 22*s*. *As the time occurs 4h 46m 32s before Noon,* the same will have to be subtracted from Sidereal Time with necessary correction. The correction is 10 second per hour. So with the addition of 10 seconds per hour, the corrected time is 4*h* 46*m* 32*s* + 47*s* = 4*h* 47*m* 19*s*. The Sidereal Time of moment will therefore be 23*h* 53*m* 22*s* (–) 4*h* 47*m* 19*s* = **19*h* 6*m* 3*s***. Now from the book ***Tables of Ascendants*** by N. C. Lahiri using the table for Allahabad for Lat. 25°N28' according to Sidereal Time 19*h* 6*m* 3*s*, the Ascendant is found to be 11^s 29° 22'. By applying Ayanamsa correction of (–) 51' for 1999, the Ascendent is 11^s 28° 31' *i.e.* **Mina 28°31'**. Similarly with the same Sidereal Time *viz.* 19*h* 6*m* 3*s*, the Tenth House is obtained as 8^s 21° 21' *i.e.* **Dhanus** 21° 21'. The Ascendant and Tenth House thus obtained agree with the figures as shown in the table given below.

ASCENDANT		ASCENDANT FOR											
		Varanasi 25°N 19' Allahabad 25°N 28'			Delhi 28°N 39'			Shimla 31°N 06' Chandigarh 30°N 44'			Srinagar 34°N 06'		
		SIDEREAL TIME											
s	°	h	m	s	h	m	s	h	m	s	h	m	s
0 Mesha	0	19	10	33	19	07	51	19	05	49	19	03	03
	10	19	41	39	18	38	11	19	35	03	19	31	09
	20	20	14	18	20	09	18	20	05	51	20	00	57
1 Vrisha	0	20	48	48	20	43	07	20	38	50	20	32	57
	10	21	25	33	21	19	07	21	14	14	21	07	36
	20	22	04	37	21	57	43	21	52	19	21	45	07
2 Mithuna	0	22	46	04	22	38	43	22	33	12	22	25	38
	10	23	29	24	23	22	04	23	16	31	23	08	55
	20	0	14	19	0	07	13	0	01	50	23	54	28
3 Karkata	0	1	00	10	0	53	34	0	48	36	0	41	45
	10	1	46	24	1	40	34	1	36	04	1	30	04
	20	2	32	39	2	27	37	2	23	46	2	18	39
4 Simha	0	3	18	24	3	14	24	3	11	22	3	07	09
	10	4	03	36	4	00	40	3	58	27	3	55	24
	20	4	48	24	4	46	22	4	45	09	4	43	19
5 Kanya	0	5	32	47	5	32	04	5	31	32	5	30	46
	10	6	17	04	6	17	27	6	17	46	6	18	14
	20	7	01	18	7	03	00	7	04	09	7	05	46
6 Tula	0	7	46	04	7	48	46	7	50	50	7	53	32
	10	8	31	11	8	34	55	8	37	46	8	41	39
	20	9	16	49	9	21	32	9	25	13	9	30	09
7 Vriscika	0	10	02	50	10	08	37	10	12	55	10	18	48
	10	10	49	10	10	55	37	11	00	31	11	07	14
	20	11	35	10	11	42	09	11	47	31	11	54	48
8 Dhanus	0	12	20	20	12	27	40	12	33	12	12	40	46
	10	13	04	12	13	11	29	13	17	03	13	24	39
	20	13	46	03	13	53	03	13	58	27	14	05	47
9 Makara	0	14	25	35	14	32	52	14	37	14	14	44	03
	10	15	02	51	15	08	49	15	13	13	15	19	51
	20	15	38	03	15	43	03	15	46	46	15	51	54
10 Kumbha	0	16	11	03	16	15	03	16	18	03	16	22	11
	10	16	42	31	16	45	21	16	47	34	16	50	36
	20	17	12	35	17	14	26	17	15	47	17	17	47
11 Mina	0	17	42	03	17	42	44	17	43	33	17	44	03
	10	18	11	15	18	10	47	18	10	28	18	10	03
	20	18	40	33	18	39	03	18	37	47	18	36	11
	30	19	10	33	19	07	51	19	05	49	19	03	03

Proportional Parts
10° degree variation of Sidereal time distributed over each degree

°	m	m	m	m	m	m
10	26	27	28	29	30	31
1	3	3	3	3	3	3
2	5	5	6	6	6	6
3	8	8	8	9	9	9
4	10	11	11	12	12	12
5	13	13	14	14	15	15
6	16	16	17	17	18	19
7	18	19	20	20	21	22
8	21	22	22	23	24	25
9	23	24	25	26	27	28
°	m	m	m	m	m	m
10	32	33	34	35	36	37
1	3	3	3	4	4	4
2	6	7	7	7	7	7
3	10	10	10	11	11	11
4	13	13	14	14	14	15
5	16	16	17	17	18	18
6	19	20	20	21	22	22
7	22	23	24	25	25	26
8	26	26	27	28	29	30
9	29	30	31	31	32	33
°	m	m	m	m	m	m
10	38	39	40	41	42	43
1	4	4	4	4	4	4
2	8	8	8	8	8	9
3	11	12	12	12	13	13
4	15	16	16	16	17	17
5	19	19	20	20	21	21
6	23	23	24	25	25	26
7	27	27	28	29	29	30
8	30	31	32	33	34	34
9	34	35	36	37	38	39
°	m	m	m	m	m	m
10	44	45	46	47	48	49
1	4	5	5	5	5	5
2	9	9	9	9	10	10
3	13	14	14	14	14	15
4	18	18	18	19	19	20
5	22	22	23	23	24	24
6	26	27	28	28	29	29
7	31	32	32	33	34	34
8	35	36	37	38	38	39
9	40	40	41	42	43	44

TABLE OF THE TENTH HOUSE

(For all places on the Earth)

Minute	SIDEREAL TIME												
	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h
m	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′
0	11 7 00	11 23 17	0 9 11	0 24 28	1 9 05	1 23 11	2 7 00	2 20 49	3 4 55	3 19 32	4 4 49	4 20 43	5 7 00
1	7 16	23 33	9 26	24 43	9 19	23 25	7 14	21 03	5 09	19 47	5 05	20 59	7 16
2	7 32	23 50	9 42	24 58	9 34	23 40	7 28	21 17	5 24	20 02	5 20	21 15	7 32
3	7 49	24 06	9 58	25 13	9 49	23 54	7 41	21 30	5 38	20 17	5 36	21 32	7 49
4	11 8 05	11 24 21	0 10 13	0 25 28	1 10 03	1 24 07	2 7 55	2 21 44	3 5 52	3 20 32	4 5 52	4 21 48	5 8 05
5	8 21	24 37	10 29	25 43	10 17	24 21	8 9	21 58	6 06	20 47	6 07	22 04	8 21
6	8 37	24 53	10 44	25 58	10 32	24 35	8 23	22 12	6 21	21 02	6 23	22 19	8 37
7	8 54	25 10	11 00	26 12	10 46	24 48	8 36	22 26	6 35	21 17	6 38	22 36	8 54
8	11 9 11	11 25 26	0 11 16	0 26 27	1 11 00	1 25 02	2 8 50	2 22 40	3 6 49	3 21 32	4 6 54	4 22 52	5 9 11
9	9 27	25 42	11 31	26 42	11 14	25 16	9 04	22 54	7 03	21 47	7 10	23 08	9 27
10	9 43	25 58	11 47	26 57	11 29	25 30	9 18	23 08	7 18	22 02	7 25	23 24	9 43
11	10 00	26 14	12 03	27 12	11 43	25 44	9 31	23 22	7 32	22 17	7 41	23 41	10 00
12	11 10 16	11 26 30	0 12 18	0 27 27	1 11 57	1 25 58	2 9 45	2 23 36	3 7 47	3 22 32	4 7 57	4 23 57	5 10 16
13	10 32	26 46	12 33	27 42	12 11	26 12	9 59	23 50	8 01	22 47	8 13	24 13	10 32
14	10 48	27 01	12 49	27 57	12 26	26 26	10 13	24 04	8 16	23 02	8 28	24 29	10 48
15	11 05	27 17	13 04	28 11	12 40	26 39	10 26	24 18	8 30	23 17	8 44	24 46	11 07
16	11 11 22	11 27 34	0 13 19	0 28 26	1 12 54	1 26 53	2 10 40	2 24 32	3 8 45	3 23 33	4 9 00	4 25 02	5 11 22
17	11 38	27 50	13 34	28 41	13 08	27 07	10 54	24 46	8 59	23 48	9 16	25 19	11 38
18	11 54	28 06	13 50	28 56	13 22	27 21	11 08	25 00	9 14	24 03	9 31	25 36	11 54
19	12 11	28 22	14 05	0 29 10	13 36	27 35	11 21	25 14	9 28	24 18	9 47	25 52	12 11
20	11 12 27	11 28 38	0 14 21	0 29 25	1 13 50	1 27 49	2 11 35	2 25 28	3 9 43	3 24 33	4 10 03	4 26 07	5 12 27
21	12 43	28 54	14 36	0 29 40	14 04	28 03	11 49	25 42	9 57	24 48	10 19	26 23	12 43
22	12 59	29 09	14 52	0 29 55	14 19	28 17	12 03	25 56	10 12	25 04	10 34	26 39	12 59
23	13 16	29 25	15 07	1 0 09	14 33	28 30	12 16	26 10	10 26	25 19	10 51	26 56	13 16
24	11 13 32	11 29 42	0 15 23	1 0 23	1 14 47	1 28 44	2 12 30	2 26 24	3 10 41	3 25 34	4 11 07	4 27 12	5 13 32
25	13 48	11 29 58	15 38	0 38	15 01	28 58	12 44	26 38	10 55	25 49	11 23	27 28	13 48
26	14 04	0 0 14	15 54	0 53	15 15	29 12	12 59	26 52	11 10	26 05	11 38	27 44	14 04
27	14 21	0 30	16 09	1 07	15 29	29 25	13·13	27 06	11 25	26 20	11 54	28 01	14 21
28	11 14 37	0 0 46	0 16 24	1 1 22	1 15 43	1 29 39	2 13 26	2 27 20	3 11 39	3 26 35	4 12 10	4 28 17	5 14 37
29	14 53	1 02	16 39	1 37	15 57	1 29 53	13 40	27 34	11 54	26 50	12 26	28 33	14 53
30	15 09	1 18	16 55	1 52	16 12	2 0 07	13 54	27 49	12 09	27 06	12 41	28 50	15 09
31	15 26	1 34	17 10	2 06	16 26	0 20	14 08	28 03	12 23	27 21	12 58	29 06	15 26
32	11 15 43	0 1 50	0 17 25	1 2 21	1 16 40	2 0 34	2 14 21	2 28 17	3 12 38	3 27 36	4 13 14	4 29 23	5 15 43
33	15 59	2 06	17 40	2 36	16 54	0 48	14 35	28 31	12 53	27 51	13 30	29 39	15 59
34	16 15	2 22	17 56	2 51	17 08	1 02	14 49	28 46	13 08	28 07	13 45	4 29 56	16 15
35	16 32	2 38	18 11	3 05	17 22	1 16	15 02	29 00	13 22	28 22	14 01	5 0 12	16 32
36	11 16 48	0 2 53	0 18 26	1 3 19	1 17 36	2 1 30	2 15 16	2 29 13	3 13 37	3 28 37	4 14 18	5 00 28	5 16 48
37	17 04	3 09	18 41	3 34	17 50	1 44	15 30	29 27	13 52	28 52	14 34	0 44	17 04
38	17 20	3 25	18 57	3 49	18 04	1 58	15 44	29 42	14 07	29 08	14 49	1 01	17 20
39	17 37	3 41	19 12	4 03	18 18	2 11	15 57	2 29 56	14 21	29 24	15 06	1 17	17 37
40	11 17 53	0 3 57	0 19 27	1 4 17	1 18 32	2 2 25	2 16 11	3 0 10	3 14 35	3 29 39	4 15 22	5 1 33	5 17 53
41	18 09	4 13	19 42	4 32	18 46	2 39	16 25	0 24	14 50	3 29 54	15 38	1 49	18 09
42	18 25	4 28	19 57	4 47	19 00	2 53	16 39	0 38	15 05	4 0 10	15 53	2 06	18 25
43	18 42	4 44	20 12	5 01	19 14	3 06	16 53	0 52	15 19	0 26	16 10	2 22	18 42
44	11 18 58	0 5 00	0 20 27	1 5 15	1 19 28	2 3 20	2 17 07	3 1 06	3 15 34	4 0 41	4 16 26	5 2 38	5 18 58
45	19 14	5 16	20 42	5 30	19 42	3 34	17 21	1 20	15 49	0 56	16 42	2 54	19 14
46	19 30	5 31	20 58	5 45	19 56	3 48	17 35	1 35	16 04	1 12	16 57	3 11	19 30
47	19 47	5 47	21 13	5 59	20 10	4 01	17 48	1 49	16 18	1 27	17 14	3 27	19 47
48	11 20 03	0 6 03	0 21 28	1 6 13	1 20 24	2 4 15	2 18 02	3 2 03	3 16 33	4 1 42	4 17 30	5 3 44	5 20 03
49	20 19	6 19	21 43	6 28	20 38	4 29	18 16	2 17	16 48	1 57	17 46	4 00	20 19
50	20 35	6 34	21 58	6 43	20 52	4 43	18 30	2 32	17 04	2 13	18 01	4 17	20 35
51	20 52	6 50	22 13	6 57	21 06	4 56.	18 44	2 46	17 19	2 29	18 18	4 33	20 52
52	11 21 08	0 7 06	0 22 28	1 7 11	1 21 20	2 5 10	2 18 58	3 3 00	3 17 33	4 2 44	4 18 34	5 4 49	5 21 08
53	21 24	7 22	22 43	7 25	21 34	5 24	19 12	3 14	17 48	3 00	18 50	5 05	21 24
54	21 40	7 37	22 58	7 40	21 48	5 38	19 26	3 29	18 03	3 15	19 06	5 22	21 40
55	21 57	7 53	23 13	7 54	22 02	5 51	19 39	3 43	18 17	3 31	19 23	5 38	21 56
56	11 22 12	0 8 08	0 23 28	1 8 08	1 22 16	2 6 05	2 19 53	3 3 57	3 18 32	4 3 47	4 19 39	5 5 55	5 22 12
57	22 28	8 24	23 43	8 22	22 30	6 19	20 07	4 12	18 47	4 02	19 55	6 11	22 28
58	22 44	8 40	23 58	8 37	22 44	6 33	20 21	4 27	19 03	4 18	20 10	6 28	22 44
59	23 01	8 55	24 13	8 51	22 57	6 46	20 35	4 41	19 18	4 33	20 27	6 44	23 01
60	11 23 17	0 9 11	0 24 28	1 9 05	1 23 11	2 7 00	2 20 49	3 4 55	3 19 32	4 4 49	4 20 43	5 7 00	5 23 17

TABLE OF THE TENTH HOUSE

(For all places on the Earth)

Minute	SIDEREAL TIME 13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
m	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′
0	5 23 17	6 9 11	6 24 28	7 9 05	7 23 11	8 7 00	8 20 49	9 4 55	9 19 32	10 4 49	10 20 43
1	23 33	9 26	24 43	9 20	23 25	7 14	21 03	5 09	19 47	5 05	20 59
2	23 49	9 42	24 58	9 34	23 39	7 28	21 17	5 23	20 02	5 20	21 15
3	24 06	9 58	25 13	9 48	23 53	7 41	21 30	5 37	20 17	5 36	21 32
4	5 24 21	6 10 13	6 25 28	7 10 03	7 24 07	8 7 55	8 21 44	9 5 52	9 20 32	10 5 52	10 21 48
5	24 37	10 29	25 43	10 17	24 21	8 09	21 58	6 06	20 47	6 07	22 04
6	24 53	10 44	25 58	10 32	24 35	8 23	22 12	6 21	21 02	6 23	22 20
7	25 09	11 00	26 13	10 46	24 48	8 36	22 26	6 35	21 17	6 39	22 36
8	5 25 26	6 11 16	6 26 27	7 11 00	7 25 02	8 8 50	8 22 40	9 6 49	9 21 32	10 6 54	10 22 52
9	25 42	11 32	26 42	11 14	25 16	9 04	22 54	7 04	21 47	7 10	23 08
10	25 58	11 47	26 57	11 29	25 30	9 18	23 08	7 18	22 02	7 25	23 24
11	26 15	12 02	27 12	11 43	25 44	9 31	23 22	7 32	22 18	7 41	23 41
12	5 26 30	6 12 18	6 27 27	7 11 57	7 25 58	8 9 45	8 23 36	9 7 47	9 22 33	10 7 57	10 23 57
13	26 46	12 33	27 42	12 11	26 12	9 59	23 50	8 02	22 48	8 13	24 13
14	27 02	12 49	27 57	12 26	26 26	10 13	24 04	8 16	23 03	8 28	24 29
15	27 19	13 04	28 11	12 40	26 39	10 26	24 18	8 30	23 18	8 44	24 46
16	5 27 34	6 13 19	6 28 26	7 12 54	7 26 53	8 10 40	8 24 32	9 8 45	9 23 33	10 9 00	10 25 02
17	27 50	13 35	28 41	13 08	27 07	10 54	24 46	9 00	23 48	9 16	25 18
18	28 06	13 50	28 56	13 22	27 21	11 08	25 00	9 14	24 03	9 31	25 34
19	28 23	14 06	29 10	13 36	27 35	11 21	25 14	9 28	24 18	9 47	25 51
20	5 28 38	6 14 21	6 29 25	7 13 50	7 27 49	8 11 35	8 25 28	9 9 43	9 24 33	10 10 03	10 26 07
21	28 54	14 37	29 39	14 04	28 03	11 49	25 42	9 58	24 48	10 19	26 23
22	29 10	14 52	6 29 54	14 19	28 17	12 03	25 56	10 12	25 03	10 35	26 39
23	29 27	15 07	7 0 09	14 33	28 30	12 16	26 10	10 26	25 19	10 51	26 56
24	5 29 42	6 15 23	7 0 23	7 14 47	7 28 44	8 12 30	8 26 24	9 10 41	9 25 34	10 11 07	10 27 12
25	5 29 58	15 38	0 38	15 01	28 58	12 44	26 38	10 56	25 49	11 23	27 28
26	6 0 14	15 54	0 52	15 15	29 12	12 58	26 52	11 10	26 04	11 38	27 44
27	0 31	16 09	1 07	15 29	29 25	13 12	27 06	11 24	26 20	11 54	28 01
28	6 0 46	6 16 24	7 1 22	7 15 43	7 29 39	8 13 26	8 27 20	9 11 39	9 26 35	10 12 10	10 28 17
29	1 02	16 39	1 37	15 57	7 29 53	13 40	27 34	11 54	26 50	12 26	28 33
30	1 18	16 55	1 52	16 12	8 0 07	13 54	27 49	12 08	27 05	12 42	28 49
31	1 35	17 10	2 06	16 26	0 20	14 07	28 03	12 22	27 21	12 58	29 06
32	6 1 50	6 17 25	7 2 21	7 16 40	8 0 34	8 14 21	8 28 17	9 12 38	9 27 36	10 13 14	10 29 23
33	2 06	17 40	2 35	16 54	0 48	14 35	28 31	12 53	27 51	13 30	29 39
34	2 22	17 56	2 50	17 08	1 02	14 49	28 45	13 07	28 06	13 46	10 29 55
35	2 39	18 11	3 05	17 22	1 16	15 02	28 59	13 22	28 22	14 02	11 0 12
36	6 2 53	6 18 26	7 3 19	7 17 36	8 1 30	8 15 16	8 29 13	9 13 37	9 28 37	10 14 18	11 0 28
37	3 09	18 41	3 33	17 50	1 44	15 30	29 27	13 52	28 52	14 34	0 44
38	3 25	18 57	3 48	18 04	1 58	15 44	29 42	14 06	29 08	14 50	1 00
39	3 41	19 12	4 02	18 18	2 11	15 57	8 29 56	14 20	29 24	15 06	1 17
40	6 3 57	6 19 27	7 4 17	7 18 32	8 2 25	8 16 11	9 0 10	9 14 35	9 29 39	10 15 22	11 1 33
41	4 13	19 42	4 31	18 46	2 39	16 25	0 24	14 50	9 29 54	15 38	1 49
42	4 28	19 57	4 46	19 00	2 53	16 39	0 38	15 04	10 0 10	15 54	2 05
43	4 44	20 12	5 00	19 14	3 06	16 53	0 52	15 19	0 26	16 10	2 22
44	6 5 00	6 20 27	7 5 15	7 19 28	8 3 20	8 17 07	9 1 06	9 15 34	10 0 41	10 16 26	11 2 38
45	5 16	20 42	5 30	19 42	3 34	17 21	1 20	15 49	0 56	16 42	2 54
46	5 31	20 58	5 44	19 56	3 48	17 35	1 35	16 03	1 12	16 58	3 10
47	5 47	21 13	5 59	20 10	4 01	17 48	1 49	16 18	1 27	17 14	3 27
48	6 6 03	6 21 28	7 6 13	7 20 24	8 4 15	8 18 02	9 2 03	9 16 33	10 1 42	10 17 30	11 3 44
49	6 19	21 43	6 28	20 38	4 29	18 16	2 17	16 48	1 57	17 46	4 00
50	6 34	21 59	6 42	20 52	4 43	18 30	2 32	17 03	2 13	18 02	4 16
51	6 50	22 14	6 56	21 06	4 56	18 44	2 46	17 18	2 29	18 18	4 33
52	6 7 06	6 22 28	7 7 11	7 21 20	8 5 10	8 18 58	9 3 00	9 17 33	10 2 44	10 18 34	11 4 49
53	7 22	22 43	7 25	21 34	5 24	19 12	3 14	17 48	3 00	18 50	5 05
54	7 37	22 59	7 40	21 48	5 38	19 26	3 29	18 02	3 15	19 06	5 21
55	7 53	23 14	7 54	22 02	5 51	19 39	3 43	18 17	3 31	19 22	5 38
56	6 8 08	6 23 28	7 8 08	7 22 16	8 6 05	8 19 53	9 3 57	9 18 32	10 3 47	10 19 39	11 5 55
57	8 24	23 43	8 22	22 30	6 19	20 07	4 12	18 47	4 02	19 55	6 11
58	8 39	23 59	8 37	22 44	6 33	20 21	4 26	19 02	4 18	20 11	6 27
59	8 55	24 14	8 51	22 57	6 46	20 35	4 40	19 17	4 33	20 27	6 44
60	6 9 11	6 24 28	7 9 05	7 23 11	8 7 00	8 20 49	9 4 55	9 19 32	10 4 49	10 20 43	11 7 00

Variation in 1 minute (60s Secs.)	0-13′	0-14′	0-15′	0-16′	0-17′
" in 30s Secs.	7′	7′	8′	8′	9′
" in 10s Secs.	2′	2′	3′	3′	3′

Ayanamsa correction for the required year to be applied to the final result. Corr. for 1998 = (−) 50 ; for 1999 = (−) 51′; for 2000 = (−) 52′.

Ascendant for CHENNAI (Latitude 13° 04' North)

Also for all other Places in or near 13° N 4' latitude

Minute	SIDEREAL TIME 0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h
m	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
0	2 12 17	2 25 52	3 9 29	3 23 20	4 7 35	4 22 11	5 7 00	5 21 49	6 6 25	6 20 40	7 4 31	7 18 08	8 1 43
1	12 31	26 06	9 43	23 34	7 50	22 26	7 15	22 04	6 39	20 54	4 45	18 22	1 57
2	12 44	26 19	9 57	23 49	8 04	22 41	7 30	22 19	6 54	21 08	4 59	18 36	2 11
3	12 57	26 32	10 10	24 03	8 18	22 55	7 45	22 33	7 08	21 22	5 12	18 49	2 24
4	2 13 11	2 26 46	3 10 24	3 24 17	4 8 33	4 23 10	5 8 00	5 22 48	6 7 22	6 21 36	7 5 26	7 19 03	8 2 38
5	13 25	27 00	10 38	24 31	8 48	23 25	8 15	23 03	7 37	21 50	5 40	19 16	2 51
6	13 39	27 13	10 52	24 45	9 02	23 40	8 30	23 17	7 51	22 04	5 54	19 30	3 05
7	13 52	27 26	11 05	24 59	9 16	23 54	8 44	23 31	8 05	22 18	6 07	19 44	3 19
8	2 14 06	2 27 40	3 11 19	3 25 13	4 9 31	4 24 09	5 8 59	5 23 46	6 8 20	6 22 32	7 6 21	7 19 57	8 3 32
9	14 20	27 54	11 33	25 27	9 45	24 24	9 14	24 01	8 35	22 46	6 35	20 10	3 46
10	14 33	28 07	11 47	25 42	10 00	24 39	9 29	24 16	8 49	23 00	6 49	20 24	4 00
11	14 46	28 20	12 00	25 56	10 14	24 53	9 43	24 30	9 03	23 14	7 02	20 38	4 13
12	2 15 00	2 28 34	3 12 14	3 26 10	4 10 29	4 25 08	5 9 58	5 24 45	6 9 18	6 23 28	7 7 16	7 20 51	8 4 27
13	15 14	28 48	12 28	26 24	10 44	25 23	10 13	25 00	9 32	23 42	7 29	21 04	4 41
14	15 28	29 02	12 42	26 38	10 58	25 38	10 28	25 15	9 47	23 56	7 43	21 18	4 55
15	15 41	29 15	12 55	26 52	11 12	25 52	10 43	25 29	10 01	24 09	7 57	21 32	5 08
16	2 15 55	2 29 29	3 13 09	3 27 06	4 11 27	4 26 07	5 10 58	5 25 44	6 10 15	6 24 23	7 8 10	7 21 45	8 5 22
17	16 09	29 43	13 23	27 20	11 42	26 22	11 13	25 59	10 29	24 37	8 24	21 58	5 36
18	16 22	2 29 56	13 37	27 35	11 56	26 37	11 28	26 13	10 44	24 51	8 38	22 12	5 50
19	16 35	3 0 09	13 50	27 49	12 10	26 51	11 42	26 27	10 58	25 05	8 51	22 26	6 03
20	2 16 49	3 0 23	3 14 04	3 28 03	4 12 25	4 27 06	5 11 57	5 26 42	6 11 12	6 25 19	7 9 05	7 22 39	8 6 17
21	17 03	0 37	14 18	28 17	12 40	27 21	12 12	26 57	11 26	25 33	9 18	22 53	6 31
22	17 17	0 50	14 32	28 31	12 55	27 36	12 27	27 12	11 41	25 47	9 32	23 07	6 45
23	17 30	1 03	14 46	28 45	13 09	27 50	12 42	27 26	11 55	26 00	9 46	23 20	6 58
24	2 17 44	3 1 17	3 15 00	3 29 00	4 13 24	4 28 05	5 12 57	5 27 41	6 12 09	6 26 14	7 9 59	7 23 34	8 7 12
25	17 58	1 31	15 14	29 14	13 39	28 20	13 12	27 56	12 23	26 28	10 13	23 47	7 26
26	18 11	1 44	15 28	29 29	13 53	28 35	13 27	28 11	12 38	26 42	10 27	24 01	7 40
27	18 24	1 58	15 41	29 43	14 07	28 50	13 41	28 25	12 52	26 56	10 40	24 15	7 53
28	2 18 38	3 2 12	3 15 55	3 29 57	4 14 22	4 29 05	5 13 56	5 28 40	6 13 06	6 27 10	7 10 54	7 24 28	8 8 07
29	18 52	2 26	16 09	4 0 11	14 37	29 20	14 11	28 55	13 20	27 24	11 07	24 41	8 21
30	19 05	2 39	16 23	0 26	14 51	29 35	14 26	29 09	13 35	27 38	11 21	24 55	8 35
31	19 18	2 52	16 36	0 40	15 05	4 29 49	14 40	29 23	13 49	27 51	11 35	25 09	8 48
32	2 19 32	3 3 06	3 16 50	4 0 54	4 15 20	5 0 04	5 14 55	5 29 38	6 14 03	6 28 05	7 11 48	7 25 22	8 9 02
33	19 46	3 20	17 04	1 08	15 35	0 19	15 10	5 29 53	14 17	28 19	12 02	25 35	9 16
34	19 59	3 34	17 18	1 23	15 50	0 34	15 25	6 0 07	14 32	28 33	12 16	25 49	9 30
35	20 12	3 47	17 32	1 37	16 04	0 48	15 40	0 21	14 46	28 46	12 29	26 03	9 44
36	2 20 26	3 4 01	3 17 46	4 1 51	4 16 19	5 1 03	5 15 55	6 0 36	6 15 00	6 29 00	7 12 43	7 26 16	8 9 58
37	20 40	4 15	18 00	2 05	16 34	1 18	16 10	0 51	15 14	29 14	12 56	26 30	10 12
38	20 54	4 28	18 14	2 20	16 49	1 33	16 25	1 06	15 29	29 28	13 10	26 44	10 26
39	21 07	4 41	18 27	2 34	17 03	1 48	16 39	1 20	15 43	29 42	13 24	26 57	10 39
40	2 21 21	3 4 55	3 18 41	4 2 48	4 17 18	5 2 03	5 16 54	6 1 35	6 15 57	6 29 56	7 13 37	7 27 11	8 10 53
41	21 35	5 09	18 55	3 02	17 33	2 18	17 09	1 50	16 11	7 0 10	13 50	27 24	11 07
42	21 48	5 23	19 09	3 17	17 47	2 33	17 24	2 04	16 26	0 24	14 04	27 38	11 21
43	22 01	5 36	19 23	3 31	18 01	2 47	17 38	2 18	16 40	0 37	14 18	27 52	11 35
44	2 22 15	3 5 50	3 19 37	4 3 45	4 18 16	5 3 02	5 17 53	6 2 33	6 16 54	7 0 51	7 14 31	7 28 05	8 11 49
45	22 29	6 04	19 51	3 59	18 31	3 17	18 08	2 48	17 08	1 05	14 45	28 19	12 03
46	22 42	6 17	20 05	4 14	18 46	3 32	18 23	3 02	17 22	1 19	14 59	28 33	12 17
47	22 55	6 30	20 18	4 28	19 00	3 47	18 37	3 16	17 36	1 32	15 12	28 46	12 30
48	2 23 09	3 6 44	3 20 32	4 4 42	4 19 15	5 4 02	5 18 52	6 3 31	6 17 50	7 1 46	7 15 26	7 29 00	8 12 44
49	23 23	6 58	20 46	4 57	19 30	4 17	19 07	3 46	18 04	2 00	15 39	29 13	12 58
50	23 36	7 12	21 00	5 11	19 45	4 32	19 22	4 00	18 19	2 14	15 53	29 27	13 12
51	23 49	7 25	21 14	5 25	19 59	4 46	19 36	4 14	18 33	2 27	16 07	29 41	13 26
52	2 24 03	3 7 39	3 21 28	4 5 40	4 20 14	5 5 01	5 19 51	6 4 29	6 18 47	7 2 41	7 16 20	7 29 54	8 13 40
53	24 17	7 53	21 42	5 55	20 29	5 16	20 06	4 44	19 01	2 55	16 33	8 0 08	13 54
54	24 30	8 07	21 56	6 09	20 43	5 31	20 21	4 58	19 15	3 09	16 47	0 22	14 08
55	24 43	8 20	22 10	6 23	20 57	5 45	20 35	5 12	19 29	3 22	17 01	0 35	14 22
56	2 24 57	3 8 34	3 22 24	4 6 38	4 21 12	5 6 00	5 20 50	6 5 27	6 19 43	7 3 36	7 17 14	8 0 49	8 14 36
57	25 11	8 47	22 38	6 52	21 27	6 15	21 05	5 42	19 57	3 50	17 27	1 02	14 50
58	25 25	9 01	22 52	7 07	21 42	6 30	21 20	5 56	20 12	4 04	17 41	1 16	15 04
59	25 38	9 14	23 06	7 21	21 56	6 45	21 34	6 10	20 26	4 17	17 55	1 30	15 18
60	2 25 52	3 9 29	3 23 20	4 7 35	4 22 11	5 7 00	5 21 49	6 6 25	6 20 40	7 4 31	7 18 08	8 1 43	8 15 32

Ascendant for CHENNAI (Latitude 13° 04' North)

Also for all other Places in or near 13° N 4' latitude

Minute	SIDEREAL TIME 13*h*	14*h*	15*h*	16*h*	17*h*	18*h*	19*h*	20*h*	21*h*	22*h*	23*h*
m	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
0	**8 15 32**	**8 29 55**	**9 15 11**	**10 1 33**	**10 18 56**	**11 7 00**	**11 25 04**	**0 12 27**	**0 28 49**	**1 14 05**	**1 28 28**
1	15 46	9 0 10	15 27	1 50	19 14	7 18	25 22	12 44	29 05	14 20	28 42
2	16 01	0 25	15 42	2 07	19 31	7 36	25 39	13 01	29 20	14 35	28 56
3	16 15	0 40	15 58	2 24	19 49	7 54	25 57	13 18	29 36	14 49	29 10
4	**8 16 29**	**9 0 55**	**9 16 14**	**10 2 41**	**10 20 07**	**11 8 13**	**11 26 15**	**0 13 35**	**0 29 52**	**1 15 04**	**1 29 24**
5	16 43	1 10	16 30	2 58	20 25	8 31	26 33	13 52	1 0 08	15 19	29 38
6	16 57	1 25	16 46	3 15	20 43	8 49	26 50	14 09	0 23	15 33	1 29 52
7	17 11	1 39	17 02	3 42	21 01	9 07	27 08	14 25	0 39	15 47	2 0 06
8	**8 17 25**	**9 1 54**	**9 17 18**	**10 3 49**	**10 21 19**	**11 9 25**	**11 27 26**	**0 14 42**	**1 0 55**	**1 16 02**	**2 0 20**
9	17 39	2 09	17 34	4 06	21 37	9 43	27 44	14 59	1 11	16 17	0 34
10	17 54	2 24	17 50	4 23	21 55	10 01	28 01	15 16	1 26	16 32	0 48
11	18 08	2 39	18 06	4 40	22 13	10 19	28 19	15 32	1 41	16 46	1 02
12	**8 18 22**	**9 2 54**	**9 18 22**	**10 4 57**	**10 22 31**	**11 10 38**	**11 28 37**	**0 15 49**	**1 1 57**	**1 17 01**	**2 1 16**
13	18 36	3 09	18 38	5 14	22 49	10 56	28 55	16 06	2 13	17 16	1 30
14	18 50	3 24	18 54	5 31	23 07	11 14	29 12	16 23	2 28	17 30	1 44
15	19 04	3 39	19 10	5 48	23 25	11 32	29 29	16 39	2 43	17 44	1 57
16	**8 19 18**	**9 3 54**	**9 19 26**	**10 6 05**	**10 23 43**	**11 11 51**	**11 29 47**	**0 16 56**	**1 2 59**	**1 17 59**	**2 2 11**
17	19 32	4 09	19 43	6 22	24 01	12 09	0 0 05	17 13	3 15	18 14	2 25
18	19 47	4 24	19 59	6 40	24 19	12 27	0 22	17 29	3 30	18 28	2 39
19	20 01	4 39	20 15	6 57	24 37	12 45	0 40	17 45	3 45	1 18 42	2 53
20	**8 20 15**	**9 4 54**	**9 20 31**	**10 7 14**	**10 24 55**	**11 13 03**	**0 0 58**	**0 18 02**	**1 4 01**	**1 18 57**	**2 3 07**
21	20 29	5 09	20 47	7 31	25 13	13 21	1 16	18 19	4 17	19 12	3 21
22	20 44	5 24	21 03	7 49	25 31	13 39	1 33	18 35	4 32	19 26	3 35
23	20 58	5 39	21 19	8 06	25 49	13 57	1 50	18 51	4 47	19 40	3 48
24	**8 21 12**	**9 5 54**	**9 21 35**	**10 8 23**	**10 26 08**	**11 14 16**	**0 2 08**	**0 19 08**	**1 5 03**	**1 19 55**	**2 4 02**
25	21 27	6 09	21 52	8 41	26 26	14 34	2 26	19 25	5 18	20 10	4 16
26	21 41	6 24	22 08	8 58	26 44	14 52	2 43	19 41	5 33	20 24	4 30
27	21 55	6 39	22 24	9 15	27 02	15 10	3 00	19 57	5 48	20 38	4 44
28	**8 22 10**	**9 6 55**	**9 22 40**	**10 9 33**	**10 27 20**	**11 15 28**	**0 3 18**	**0 20 14**	**1 6 04**	**1 20 53**	**2 4 58**
29	22 24	7 10	22 57	9 50	27 38	15 46	3 35	20 31	6 19	21 07	5 12
30	22 39	7 25	23 13	10 08	27 56	16 04	3 53	20 47	6 34	21 22	5 26
31	22 53	7 40	23 29	10 25	28 14	16 22	4 10	21 03	6 49	21 36	5 39
32	**8 23 07**	**9 7 56**	**9 23 46**	**10 10 42**	**10 28 32**	**11 16 40**	**0 4 27**	**0 21 20**	**1 7 05**	**1 21 50**	**2 5 53**
33	23 22	8 11	24 03	11 00	28 50	16 58	4 45	21 37	7 20	22 05	6 07
34	23 36	8 26	24 19	11 17	29 08	17 16	5 02	21 53	7 35	22 19	6 21
35	23 50	8 41	24 35	11 34	29 26	17 34	5 19	22 09	7 50	22 33	6 34
36	**8 24 05**	**9 8 57**	**9 24 52**	**10 11 52**	**10 29 44**	**11 17 52**	**0 5 37**	**0 22 25**	**1 8 06**	**1 22 48**	**2 6 48**
37	24 20	9 13	25 09	12 10	11 0 02	18 10	5 54	22 41	8 21	23 02	7 02
38	24 34	9 28	25 25	12 27	0 20	18 28	6 12	22 57	8 36	23 17	7 16
39	24 48	9 43	25 41	12 44	0 38	18 46	6 29	23 13	8 51	23 31	7 29
40	**8 25 03**	**9 9 59**	**9 25 58**	**10 13 02**	**11 0 57**	**11 19 05**	**0 6 46**	**0 23 29**	**1 9 06**	**1 23 45**	**2 7 43**
41	25 18	10 15	26 15	13 20	1 15	19 23	7 03	23 46	9 21	23 59	7 57
42	25 32	10 30	26 31	13 37	1 33	19 41	7 21	24 02	9 36	24 14	8 11
43	25 46	10 45	26 47	13 55	1 51	19 59	7 38	24 18	9 51	24 28	8 24
44	**8 26 01**	**9 11 01**	**9 27 04**	**10 14 13**	**11 2 09**	**11 20 17**	**0 7 55**	**0 24 34**	**1 10 06**	**1 24 42**	**2 8 38**
45	26 16	11 17	27 21	14 31	2 27	20 35	8 12	24 50	10 21	24 56	8 52
46	26 30	11 32	27 38	14 48	2 45	20 53	8 29	25 06	10 36	25 10	9 06
47	26 44	11 47	27 54	15 05	3 03	21 11	8 46	25 22	10 51	25 24	9 19
48	**8 26 59**	**9 12 03**	**9 28 11**	**10 15 23**	**11 3 22**	**11 21 29**	**0 9 03**	**0 25 38**	**1 11 06**	**1 25 38**	**2 9 33**
49	27 14	12 19	28 28	15 41	3 40	21 47	9 20	25 54	11 21	25 52	9 47
50	27 29	12 34	28 45	15 58	3 58	22 05	9 37	26 10	11 36	26 07	10 01
51	27 43	12 49	29 01	16 16	4 16	22 23	9 54	26 26	11 51	26 21	10 14
52	**8 27 58**	**9 13 05**	**9 29 18**	**10 16 34**	**11 4 35**	**11 22 41**	**0 10 11**	**0 26 42**	**1 12 06**	**1 26 35**	**2 10 28**
53	28 13	13 21	29 35	16 52	4 53	22 59	10 28	26 58	12 21	26 49	10 41
54	28 27	13 36	9 29 52	17 09	5 11	23 17	10 45	27 14	12 36	27 03	10 55
55	28 41	13 52	10 0 08	17 27	5 29	23 35	11 02	27 30	12 50	27 17	11 09
56	**8 28 56**	**9 14 08**	**10 0 25**	**10 17 45**	**11 5 47**	**11 23 53**	**0 11 19**	**0 27 46**	**1 13 05**	**1 27 31**	**2 11 22**
57	29 11	14 24	0 42	18 03	6 05	24 11	11 36	28 02	13 20	27 45	11 36
58	29 26	14 39	0 59	18 20	6 23	24 28	11 53	28 17	13 35	27 59	11 50
59	29 40	14 55	1 16	18 38	6 41	24 46	12 10	28 33	13 50	28 14	12 03
60	**8 29 55**	**9 15 11**	**10 1 33**	**10 18 56**	**11 7 00**	**11 25 04**	**0 12 27**	**0 28 49**	**1 14 05**	**1 28 28**	**2 12 17**

Variation in 1 minute (60s Secs.)	0-13'	0-14'	0-15'	0-16'	0-17'	0-18'	0-19'
" in 30s Secs.	7'	7'	8'	8'	9'	9'	10'
" in 10s Secs.	2'	2'	3'	3'	3'	3'	3'

Ayanamsa correction for the required year is to be applied to the final result. Corr. for 1998 = (–) 50'; for 1999 = (–) 51'; for 2000 = (–) 52'.

Ascendant for Latitude 19° 0' North

For **MUMBAI** 18°N 58', Ahmadnagar & Jagdalpur etc.

Minute	SIDEREAL TIME												
	0h	*1h*	*2h*	*3h*	*4h*	*5h*	*6h*	*7h*	*8h*	*9h*	*10h*	*11h*	*12h*
m	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′
0	**2 14 48**	**2 28 11**	**3 11 31**	**3 25 01**	**4 8 46**	**4 22 48**	**5 7 00**	**5 21 12**	**6 5 14**	**6 18 59**	**7 2 29**	**7 15 49**	**7 29 12**
1	15 01	28 24	11 44	25 14	9 00	23 02	7 14	21 26	5 28	19 13	2 42	16 02	29 25
2	15 15	28 38	11 58	25 28	9 14	23 17	7 29	21 40	5 42	19 27	2 56	16 16	29 39
3	15 28	28 51	12 11	25 41	9 28	23 31	7 43	21 54	5 55	19 40	3 09	16 29	7 29 53
4	**2 15 42**	**2 29 05**	**3 12 25**	**3 25 55**	**4 9 42**	**4 23 45**	**5 7 57**	**5 22 08**	**6 6 09**	**6 19 54**	**7 3 22**	**7 16 42**	**8 0 06**
5	15 55	29 18	12 38	26 09	9 56	23 59	8 11	22 22	6 23	20 08	3 35	16 55	0 19
6	16 09	29 32	12 52	26 23	10 10	24 13	8 26	22 37	6 37	20 21	3 49	17 09	0 33
7	16 22	29 45	13 05	26 36	10 24	24 27	8 40	22 51	6 51	20 35	4 03	17 22	0 47
8	**2 16 36**	**2 29 58**	**3 13 19**	**3 26 50**	**4 10 38**	**4 24 41**	**5 8 54**	**5 23 05**	**6 7 05**	**6 20 48**	**7 4 16**	**7 17 35**	**8 1 00**
9	16 49	3 0 11	13 32	27 04	10 52	24 55	9 08	23 19	7 19	21 01	4 29	17 48	1 13
10	17 03	0 25	13 46	27 18	11 06	25 10	9 23	23 33	7 33	21 15	4 43	18 02	1 27
11	17 16	0 38	13 59	27 31	11 20	25 24	9 37	23 47	7 46	21 29	4 56	18 15	1 41
12	**2 17 30**	**3 0 51**	**3 14 12**	**3 27 45**	**4 11 34**	**4 25 38**	**5 9 51**	**5 24 01**	**6 8 00**	**6 21 42**	**7 5 09**	**7 18 28**	**8 1 54**
13	17 43	1 04	14 25	27 58	11 48	25 52	10 05	24 15	8 14	21 55	5 22	18 41	2 08
14	17 57	1 18	14 39	28 12	12 02	26 07	10 20	24 30	8 28	22 09	5 36	18 55	2 22
15	18 10	1 31	14 52	28 25	12 16	26 21	10 34	24 44	8 41	22 23	5 49	19 09	2 35
16	**2 18 24**	**3 1 44**	**3 15 06**	**3 28 39**	**4 12 30**	**4 26 35**	**5 10 48**	**5 24 58**	**6 8 55**	**6 22 36**	**7 6 02**	**7 19 22**	**8 2 49**
17	18 37	1 57	15 19	28 53	12 44	26 49	11 02	25 12	9 09	22 50	6 15	19 35	3 02
18	18 51	2 11	15 33	29 07	12 58	27 04	11 16	25 26	9 23	23 04	6 29	19 49	3 16
19	19 04	2 24	15 46	29 20	13 12	27 18	11 30	25 40	9 37	23 17	6 43	20 02	3 29
20	**2 19 17**	**3 2 38**	**3 16 00**	**3 29 34**	**4 13 26**	**4 27 32**	**5 11 44**	**5 25 54**	**6 9 51**	**6 23 31**	**7 6 56**	**7 20 15**	**8 3 43**
21	19 30	2 51	16 13	3 29 48	13 40	27 46	11 58	26 08	10 05	23 44	7 09	20 28	3 57
22	19 44	3 05	16 27	4 0 02	13 54	28 00	12 13	26 22	10 19	23 58	7 23	20 42	4 11
23	19 57	3 18	16 40	0 15	14 08	28 14	12 27	26 36	10 32	24 12	7 36	20 56	4 24
24	**2 20 11**	**3 3 31**	**3 16 54**	**4 0 29**	**4 14 22**	**4 28 28**	**5 12 41**	**5 26 50**	**6 10 46**	**6 24 25**	**7 7 49**	**7 21 09**	**8 4 38**
25	20 24	3 44	17 07	0 43	14 36	28 42	12 55	27 04	11 00	24 38	8 02	21 22	4 52
26	20 38	3 58	17 21	0 57	14 50	28 57	13 10	27 18	11 14	24 52	8 16	21 36	5 06
27	20 51	4 11	17 34	1 10	15 04	29 11	13 24	27 32	11 27	25 06	8 29	21 49	5 19
28	**2 21 04**	**3 4 24**	**3 17 47**	**4 1 24**	**4 15 18**	**4 29 25**	**5 13 38**	**5 27 46**	**6 11 41**	**6 25 19**	**7 8 42**	**7 22 02**	**8 5 33**
29	21 17	4 37	18 00	1 38	15 32	29 39	13 52	28 00	11 55	25 32	8 55	22 15	5 47
30	21 31	4 51	18 14	1 52	15 46	4 29 54	14 07	28 14	12 09	25 46	9 09	22 29	6 01
31	21 44	5 04	18 27	2 05	16 00	5 0 08	14 21	28 28	12 22	26 00	9 23	22 43	6 14
32	**2 21 58**	**3 5 18**	**3 18 41**	**4 2 19**	**4 16 14**	**5 0 22**	**5 14 35**	**5 28 42**	**6 12 36**	**6 26 13**	**7 9 36**	**7 22 56**	**8 6 28**
33	22 11	5 31	18 54	2 33	16 28	0 36	14 49	28 56	12 50	26 26	9 49	23 09	6 42
34	22 25	5 45	19 08	2 47	16 42	0 51	15 04	29 10	13 04	26 40	10 03	23 23	6 56
35	22 38	5 58	19 21	3 00	16 56	1 05	15 18	29 24	13 17	26 53	10 16	23 36	7 09
36	**2 22 51**	**3 6 11**	**3 19 35**	**4 3 14**	**4 17 10**	**5 1 19**	**5 15 32**	**5 29 38**	**6 13 31**	**6 27 06**	**7 10 29**	**7 23 49**	**8 7 23**
37	23 04	6 24	19 48	3 28	17 24	1 33	15 46	5 29 52	13 45	27 19	10 42	24 02	7 37
38	23 18	6 38	20 02	3 42	17 38	1 48	16 00	6 0 06	13 59	27 33	10 56	24 16	7 51
39	23 31	6 51	20 15	3 55	17 52	2 02	16 14	0 20	14 12	27 47	11 09	24 30	8 04
40	**2 23 45**	**3 7 04**	**3 20 29**	**4 4 09**	**4 18 06**	**5 2 16**	**5 16 28**	**6 0 34**	**6 14 26**	**6 28 00**	**7 11 22**	**7 24 43**	**8 8 18**
41	23 58	7 17	20 43	4 23	18 20	2 30	16 42	0 48	14 40	28 13	11 35	24 56	8 32
42	24 12	7 31	20 57	4 37	18 34	2 44	16 57	1 02	14 54	28 27	11 49	25 10	8 46
43	24 25	7 44	21 10	4 51	18 48	2 58	17 11	1 16	15 07	28 41	12 03	25 23	8 59
44	**2 24 38**	**3 7 58**	**3 21 24**	**4 5 05**	**4 19 02**	**5 3 12**	**5 17 25**	**6 1 30**	**6 15 21**	**6 28 54**	**7 12 16**	**7 25 36**	**8 9 13**
45	24 51	8 11	21 37	5 19	19 16	3 26	17 39	1 44	15 34	29 07	12 29	25 49	9 27
46	25 05	8 25	21 51	5 33	19 31	3 41	17 54	1 58	15 48	29 21	12 43	26 03	9 41
47	25 18	8 38	22 04	5 46	19 45	3 55	18 08	2 12	16 02	29 35	12 56	26 17	9 55
48	**2 25 32**	**3 8 51**	**3 22 18**	**4 6 00**	**4 19 59**	**5 4 09**	**5 18 22**	**6 2 26**	**6 16 15**	**6 29 48**	**7 13 09**	**7 26 30**	**8 10 09**
49	25 45	9 04	22 31	6 14	20 13	4 23	18 36	2 40	16 29	7 0 01	13 22	26 43	10 23
50	25 59	9 18	22 45	6 28	20 27	4 38	18 51	2 54	16 43	0 15	13 36	26 57	10 37
51	26 12	9 31	22 58	6 41	20 41	4 52	19 05	3 08	16 56	0 28	13 49	27 11	10 50
52	**2 26 25**	**3 9 44**	**3 23 12**	**4 6 55**	**4 20 55**	**5 5 06**	**5 19 19**	**6 3 22**	**6 17 10**	**7 0 41**	**7 14 02**	**7 27 24**	**8 11 04**
53	26 38	9 57	23 25	7 08	21 09	5 20	19 33	3 36	17 24	0 54	14 15	27 37	11 18
54	26 52	10 11	23 39	7 22	21 24	5 35	19 47	3 50	17 38	1 08	14 29	27 51	11 32
55	27 05	10 24	23 52	7 35	21 38	5 49	20 01	4 04	17 51	1 22	14 42	28 05	11 46
56	**2 27 18**	**3 10 38**	**3 24 06**	**4 7 51**	**4 21 52**	**5 6 03**	**5 20 15**	**6 4 18**	**6 18 05**	**7 1 35**	**7 14 55**	**7 28 18**	**8 12 00**
57	27 31	10 51	24 20	8 05	22 06	6 17	20 29	4 32	18 18	1 48	15 08	28 31	12 14
58	27 45	11 05	24 34	8 19	22 20	6 32	20 44	4 46	18 32	2 02	15 22	28 45	12 28
59	27 58	11 18	24 47	8 32	22 34	6 46	20 58	5 00	18 46	2 16	15 36	28 59	12 42
60	**2 28 11**	**3 11 31**	**3 25 01**	**4 8 46**	**4 22 48**	**5 7 00**	**5 21 12**	**6 5 14**	**6 18 59**	**7 2 29**	**7 15 49**	**7 29 12**	**8 12 56**

Ascendant for Latitude 19°0' North

For **MUMBAI** 18°N58' Ahmadnagar & Jaglalpur etc.

Minute	SIDEREAL TIME										
	13*h*	14*h*	15*h*	16*h*	17*h*	18*h*	19*h*	20*h*	21*h*	22*h*	23*h*
m	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
0	**8 12 56**	**8 27 23**	**9 12 53**	**9 29 45**	**10 17 56**	**11 7 00**	**11 26 03**	**0 14 15**	**1 1 07**	**1 16 37**	**2 1 04**
1	13 10	27 38	13 10	10 0 03	18 15	7 19	26 22	14 33	1 23	16 52	1 18
2	13 24	27 53	13 26	0 20	18 34	7 38	26 40	14 50	1 39	17 07	1 32
3	13 38	28 08	13 42	0 37	18 53	7 57	26 59	15 07	1 55	17 22	1 46
4	**8 13 52**	**8 28 23**	**9 13 58**	**10 0 55**	**10 19 12**	**11 8 17**	**11 27 18**	**0 15 25**	**1 2 11**	**1 17 37**	**2 2 00**
5	14 06	28 38	14 15	1 13	19 31	8 36	27 37	15 43	2 27	17 52	2 14
6	14 21	28 53	14 31	1 30	19 49	8 55	27 55	16 00	2 43	18 06	2 28
7	14 35	29 08	14 47	1 48	20 08	9 15	28 14	16 17	2 59	18 21	2 42
8	**14 49**	**8 29 23**	**9 15 03**	**10 2 06**	**10 20 27**	**11 9 34**	**11 28 33**	**0 16 35**	**1 3 15**	**1 18 36**	**2 2 56**
9	15 03	29 38	15 20	2 24	20 46	9 53	28 52	16 53	3 31	18 51	3 10
10	15 17	8 29 53	15 36	2 41	21 04	10 12	29 10	17 10	3 47	19 05	3 24
11	15 31	9 0 08	15 52	2 59	21 23	10 32	29 28	17 27	4 03	19 20	3 37
12	**8 15 45**	**9 0 23**	**9 16 09**	**10 3 17**	**10 21 42**	**11 10 51**	**11 29 47**	**0 17 44**	**1 4 19**	**1 19 35**	**2 3 51**
13	15 59	0 38	16 27	3 35	22 01	11 10	0 0 06	18 02	4 35	19 50	4 05
14	16 14	0 53	16 42	3 53	22 20	11 29	0 24	18 19	4 50	20 04	4 19
15	16 28	1 08	16 58	4 11	22 39	11 48	0 42	18 36	5 06	20 19	4 33
16	**8 16 42**	**9 1 24**	**9 17 15**	**10 4 29**	**10 22 58**	**11 12 07**	**0 1 01**	**0 18 53**	**1 5 22**	**1 20 34**	**2 4 47**
17	16 56	1 39	17 32	4 47	23 17	12 26	1 20	19 11	5 38	20 49	5 01
18	17 11	1 54	17 48	5 05	23 36	12 45	1 38	19 28	5 53	21 03	5 15
19	17 25	2 09	18 04	5 23	23 55	13 05	1 56	19 45	6 09	21 17	5 28
20	**8 17 39**	**9 2 25**	**9 18 21**	**10 5 41**	**10 24 14**	**11 13 24**	**0 2 15**	**0 20 02**	**1 6 25**	**1 21 32**	**2 5 42**
21	17 53	2 40	18 38	5 59	24 33	13 43	2 24	20 19	6 41	21 47	5 56
22	18 08	2 55	18 55	6 17	24 52	14 02	2 52	20 36	6 56	22 01	6 10
23	18 22	3 10	19 11	6 35	25 11	14 22	3 10	20 53	7 12	22 15	6 23
24	**8 18 36**	**9 3 26**	**9 19 28**	**10 6 53**	**10 25 30**	**11 14 41**	**0 3 29**	**0 21 10**	**1 7 28**	**1 22 30**	**2 6 37**
25	18 51	3 42	19 45	7 11	25 49	15 00	3 47	21 27	7 44	22 45	6 51
26	19 05	3 57	20 02	7 29	26 08	15 19	4 05	21 44	7 59	22 59	7 05
27	19 19	4 12	20 18	7 47	26 27	15 38	4 23	22 01	8 14	23 13	7 18
28	**8 19 34**	**9 4 28**	**9 20 35**	**10 8 05**	**10 26 47**	**11 15 57**	**0 4 42**	**0 22 18**	**1 8 30**	**1 23 28**	**2 7 32**
29	19 49	4 44	20 52	8 23	27 06	16 16	5 00	22 35	8 46	23 43	7 46
30	20 03	4 59	21 09	8 41	27 25	16 35	5 18	22 52	9 01	23 57	8 00
31	20 17	5 14	21 25	8 59	27 44	16 55	5 36	23 08	9 16	24 11	8 13
32	**8 20 32**	**9 5 30**	**9 21 42**	**10 9 18**	**10 28 03**	**11 17 13**	**0 5 55**	**0 23 25**	**1 9 32**	**1 24 26**	**2 8 27**
33	20 47	5 46	21 59	9 36	28 22	17 32	6 13	23 42	9 48	24 41	8 41
34	21 01	6 01	22 16	9 54	28 41	17 51	6 31	23 59	10 03	24 55	8 55
35	21 15	6 16	22 33	10 12	29 00	18 11	6 59	24 15	10 18	25 09	9 08
36	**8 21 30**	**9 6 32**	**9 22 50**	**10 10 31**	**10 29 19**	**11 18 30**	**0 7 07**	**0 24 32**	**1 10 34**	**1 25 24**	**2 9 22**
37	21 45	6 48	23 07	10 50	29 38	18 49	7 25	24 49	10 50	25 39	9 36
38	21 59	7 03	23 24	11 08	10 29 57	19 08	7 43	25 06	11 05	25 53	9 50
39	22 13	7 19	23 41	11 26	11 0 16	19 27	8 01	25 22	11 20	26 07	10 03
40	**8 22 28**	**9 7 35**	**9 23 58**	**10 11 45**	**11 0 36**	**11 19 46**	**0 8 19**	**0 25 39**	**1 11 35**	**1 26 21**	**2 10 17**
41	22 43	7 51	24 15	12 04	0 55	20 05	8 37	25 56	11 51	26 36	10 31
42	22 57	8 06	24 33	12 22	1 14	20 24	8 55	26 12	12 06	26 50	10 45
43	23 11	8 22	24 50	12 40	1 33	20 43	9 13	26 28	12 21	27 04	10 58
44	**8 23 26**	**9 8 38**	**9 25 07**	**10 12 59**	**11 1 53**	**11 21 02**	**0 9 31**	**0 26 45**	**1 12 36**	**1 27 18**	**2 11 11**
45	23 41	8 54	25 24	13 18	2 12	21 21	9 49	27 02	12 52	27 33	11 25
46	23 55	9 09	25 42	13 36	2 31	21 40	10 07	27 18	13 07	27 47	11 39
47	24 10	9 25	25 59	13 54	2 50	21 59	10 25	27 34	13 22	28 01	11 52
48	**8 24 25**	**9 9 41**	**9 26 16**	**10 14 13**	**11 3 09**	**11 22 18**	**0 10 43**	**0 27 51**	**1 13 37**	**1 28 15**	**2 12 06**
49	24 40	9 57	26 33	14 32	3 28	22 37	11 01	28 08	13 52	28 29	12 20
50	24 54	10 13	26 51	14 50	3 47	22 55	11 19	28 24	14 07	28 43	12 34
51	25 09	10 29	27 08	15 08	4 06	23 14	11 37	28 40	14 22	28 57	12 47
52	**8 25 24**	**9 10 45**	**9 27 25**	**10 15 27**	**11 4 26**	**11 23 33**	**0 11 54**	**0 28 57**	**1 14 37**	**1 29 11**	**2 13 00**
53	25 39	11 01	27 43	15 46	4 45	23 52	12 12	29 14	14 52	29 26	13 14
54	25 53	11 17	28 00	16 04	5 04	24 10	12 30	29 30	15 07	29 40	13 28
55	26 08	11 33	28 17	16 23	5 23	24 29	12 47	0 29 46	15 22	1 29 54	13 41
56	**8 26 23**	**9 11 49**	**9 28 35**	**10 16 42**	**11 5 43**	**11 24 48**	**0 13 05**	**1 0 02**	**1 15 37**	**2 0 08**	**2 13 54**
57	26 38	12 05	28 53	17 01	6 02	25 07	13 23	0 19	15 52	0 22	14 08
58	26 53	12 21	29 10	17 19	6 21	25 25	13 40	0 35	16 07	0 36	14 22
59	27 08	12 37	29 27	17 37	6 40	25 44	13 57	0 51	16 22	0 50	14 35
60	**8 27 23**	**9 12 53**	**9 29 45**	**10 17 56**	**11 7 00**	**11 26 03**	**0 14 15**	**1 1 07**	**1 16 37**	**2 1 04**	**2 14 48**

Variation in 1 minute (60s Secs.)	0-13'	0-14'	0-15'	0-16'	0-17'	0-18'	0-19'	0-20'
" in 30s Secs.	7'	7'	8'	8'	9'	9'	10'	10'
" in 10s Secs.	2'	2'	3'	3'	3'	3'	3'	3'

Ayanamsa correction for the required year is to be applied to the final result. Corr. for 1998 = (–) 50'; for 1999 = (–) 51'; for 2000 = (–) 52'.

Ascendant for CALCUTTA (Latitude 22° 35' North)

(Also for Kharagpur 22°N 30', Indore 22°N 43', Jamnagar 22°N 27' etc.)

Minute	SIDEREAL TIME												
	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h
m	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
0	2 16 24	2 29 39	3 12 47	3 26 02	4 9 29	4 23 10	5 7 00	5 20 50	6 4 31	6 17 58	7 1 13	7 14 21	7 27 36
1	16 37	2 29 52	13 00	26 15	9 42	23 24	7 14	21 04	4 44	18 11	1 26	14 34	27 49
2	16 51	3 0 06	13 13	26 29	9 56	23 38	7 28	21 18	4 58	18 25	1 40	14 48	28 03
3	17 04	0 19	13 26	26 42	10 09	23 51	7 41	21 31	5 12	18 39	1 53	15 01	28 17
4	2 17 18	3 0 32	3 13 39	3 26 55	4 10 23	4 24 05	5 7 55	5 21 45	6 5 25	6 18 52	7 2 06	7 15 14	7 28 30
5	17 31	0 45	13 52	27 08	10 37	24 19	8 09	21 59	5 38	19 05	2 19	15 27	28 43
6	17 45	0 58	14 06	27 22	10 51	24 33	8 23	22 13	5 52	19 19	2 32	15 40	28 57
7	17 58	1 11	14 19	27 35	11 04	24 47	8 36	22 26	6 06	19 32	2 45	15 53	29 10
8	2 18 11	3 1 24	3 14 32	3 27 48	4 11 18	4 25 01	5 8 50	5 22 40	6 6 19	6 19 45	7 2 58	7 16 06	7 29 24
9	18 24	1 37	14 45	28 01	11 31	25 15	9 04	22 54	6 32	19 58	3 11	16 19	29 37
10	18 38	1 50	14 59	28 15	11 44	25 29	9 18	23 08	6 46	20 12	3 25	16 33	7 29 51
11	18 51	2 03	15 12	28 28	11 58	25 42	9 32	23 21	7 00	20 36	3 38	16 46	8 0 04
12	2 19 04	3 2 16	3 15 25	3 28 42	4 12 12	4 25 56	5 9 46	5 23 35	6 7 13	6 20 39	7 3 51	7 16 59	8 0 17
13	19 17	2 29	15 38	28 55	12 26	26 10	10 00	23 48	7 26	20 52	4 04	17 12	0 30
14	19 31	2 43	15 52	29 09	12 40	26 24	10 14	24 02	7 40	21 06	4 17	17 26	0 44
15	19 44	2 55	16 05	29 22	12 53	26 37	10 28	24 15	7 54	21 19	4 30	17 39	0 58
16	2 19 58	3 3 09	3 16 18	3 29 35	4 13 07	4 26 51	5 10 42	5 24 29	6 8 07	6 21 32	7 4 43	7 17 52	8 1 11
17	20 11	3 22	16 31	3 29 48	13 21	27 05	10 56	24 43	8 21	21 45	4 56	18 05	1 25
18	20 25	3 36	16 45	4 0 02	13 35	27 19	11 10	24 57	8 35	21 59	5 10	18 19	1 39
19	20 38	3 49	16 58	0 15	13 48	27 32	11 23	25 10	8 48	22 12	5 23	18 32	1 52
20	2 20 51	3 4 02	3 17 11	4 0 29	4 14 02	4 27 46	5 11 37	5 25 24	6 9 02	6 22 25	7 5 36	7 18 45	8 2 06
21	21 04	4 15	17 24	0 42	14 15	28 00	11 51	25 38	9 15	22 38	5 49	18 58	2 19
22	21 18	4 28	17 38	0 56	14 29	28 14	12 05	25 52	9 29	22 52	6 03	19 12	2 33
23	21 31	4 42	17 51	1 09	14 42	28 27	12 18	26 05	9 42	23 05	6 16	19 25	2 46
24	2 21 44	3 4 54	3 18 04	4 1 23	4 14 56	4 28 41	5 12 32	5 26 19	6 9 56	6 23 18	7 6 29	7 19 38	8 3 00
25	21 57	5 07	18 17	1 36	15 10	28 55	12 46	26 33	10 09	23 31	6 42	19 51	3 13
26	22 11	5 20	18 31	1 50	15 24	29 09	13 00	26 47	10 23	23 45	6 55	20 05	3 27
27	22 24	5 33	18 44	2 03	15 37	29 23	13 14	27 00	10 36	23 58	7 08	20 18	3 41
28	2 22 37	3 5 46	3 18 57	4 2 17	4 15 51	4 29 37	5 13 28	5 27 14	6 10 49	6 24 11	7 7 21	7 20 31	8 3 54
29	22 50	5 59	19 10	2 30	16 05	4 29 51	13 42	27 28	11 02	24 24	7 34	20 44	4 08
30	23 04	6 13	19 24	2 44	16 19	5 0 05	13 56	27 42	11 16	24 37	7 48	20 58	4 22
31	23 17	6 26	19 36	2 57	16 32	0 19	14 09	27 55	11 30	24 50	8 01	21 10	4 35
32	2 23 29	3 6 39	3 19 49	4 3 11	4 16 46	5 0 32	5 14 23	5 28 09	6 11 43	6 25 03	7 8 14	7 21 23	8 4 49
33	23 42	6 52	20 02	3 24	17 00	0 46	14 37	28 23	11 56	25 16	8 27	21 36	5 03
34	23 56	7 05	20 16	3 38	17 14	1 00	14 51	28 37	12 10	25 30	8 40	21 50	5 17
35	24 09	7 18	20 29	3 51	17 27	1 14	15 05	28 50	12 24	25 43	8 53	22 03	5 30
36	2 24 22	3 7 31	3 20 42	4 4 04	4 17 41	5 1 28	5 15 19	5 29 04	6 12 37	6 25 56	7 9 06	7 22 16	8 5 44
37	24 35	7 44	20 55	4 17	17 55	1 42	15 33	29 18	12 50	26 09	9 19	22 29	5 57
38	24 49	7 58	21 09	4 31	18 09	1 56	15 47	29 32	13 04	26 23	9 33	22 43	6 11
39	25 02	8 11	21 22	4 44	18 22	2 09	16 00	29 45	13 18	26 36	9 46	22 56	6 25
40	2 25 15	3 8 24	3 21 35	4 4 58	4 18 36	5 2 23	5 16 14	5 29 58	6 13 31	6 26 49	7 9 59	7 23 09	8 6 38
41	25 28	8 37	21 48	5 12	18 50	2 37	16 28	6 0 12	13 44	27 02	10 12	23 22	6 52
42	25 42	8 51	22 02	5 26	19 04	2 51	16 42	0 26	13 58	27 16	10 25	23 36	7 06
43	25 55	9 04	22 15	5 39	19 17	3 04	16 55	0 39	14 12	27 29	10 38	23 49	7 19
44	2 26 08	3 9 17	3 22 28	4 5 53	4 19 31	5 3 18	5 17 09	6 0 53	6 14 25	6 27 42	7 10 51	7 24 02	8 7 33
45	26 21	9 30	22 41	6 06	19 45	3 32	17 23	1 07	14 38	27 55	11 04	24 15	7 47
46	26 35	9 43	22 55	6 20	19 59	3 46	17 37	1 21	14 52	28 09	11 18	24 29	8 01
47	26 48	9 56	23 08	6 33	20 12	4 00	17 50	1 34	15 06	28 22	11 31	24 43	8 15
48	2 27 01	3 10 09	3 23 21	4 6 47	4 20 25	5 4 14	5 18 04	6 1 48	6 15 18	6 28 35	7 11 44	7 24 56	8 8 29
49	27 14	10 22	23 34	7 00	20 39	4 28	18 18	2 02	15 31	28 48	11 57	25 09	8 43
50	27 28	10 36	23 48	7 14	20 53	4 42	18 32	2 16	15 45	29 02	12 10	25 23	8 57
51	27 41	10 49	24 01	7 28	21 06	4 56	18 45	2 29	15 59	29 15	12 23	25 36	9 10
52	2 27 54	3 11 02	3 24 15	4 7 41	4 21 20	5 5 10	5 18 59	6 2 42	6 16 12	6 29 28	7 12 36	7 25 49	8 9 24
53	28 07	11 15	24 28	7 54	21 34	5 24	19 13	2 56	16 25	29 41	12 49	26 02	9 38
54	28 20	11 28	24 42	8 08	21 48	5 38	19 27	3 10	16 39	6 29 55	13 02	26 16	9 52
55	28 33	11 41	24 55	8 22	22 01	5 51	19 41	3 23	16 53	7 0 08	13 15	26 29	10 06
56	2 28 46	3 11 54	3 25 08	4 8 35	4 22 15	5 6 05	5 19 55	6 3 37	6 17 06	7 0 21	7 13 28	7 26 42	8 10 20
57	28 59	12 07	25 21	8 48	22 29	6 19	20 09	3 51	17 19	0 34	13 41	26 55	10 34
58	29 13	12 21	25 35	9 02	22 43	6 33	20 23	4 05	17 32	0 47	13 55	27 09	10 48
59	29 26	12 34	25 48	9 16	22 56	6 46	20 36	4 18	17 45	1 00	14 08	27 23	11 01
60	2 29 39	3 12 47	3 26 02	4 9 29	4 23 10	5 7 00	5 20 50	6 4 31	6 17 58	7 1 13	7 14 21	7 27 36	8 11 15

Ascendant for CALCUTTA (Latitude 22° 35' North)

(Also for Kharagpur 22°N 30', Indore 22°N 43', Jamnagar 22° N 27' etc.)

Minute	SIDEREAL TIME										
	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h
m	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '	s ° '
0	8 11 15	8 25 42	9 11 20	9 28 31	10 17 15	11 7 00	11 26 45	0 15 29	1 2 40	1 18 18	2 2 45
1	11 29	25 57	11 37	28 49	17 35	7 20	27 05	15 47	2 57	18 33	2 59
2	11 43	26 12	11 53	29 07	17 54	7 40	27 24	16 05	3 13	18 48	3 13
3	11 57	26 27	12 09	29 25	18 13	8 00	27 43	16 23	3 29	19 03	3 26
4	8 12 11	8 26 42	9 12 26	9 29 43	10 18 33	11 8 20	11 28 03	0 16 41	1 3 45	1 19 18	2 3 40
5	12 25	26 57	12 43	10 0 01	18 53	8 40	28 23	16 59	4 01	19 33	3 54
6	12 40	27 12	12 59	0 19	19 12	9 00	28 42	17 16	4 17	19 48	4 08
7	12 54	27 28	13 15	0 37	19 31	9 20	29 01	17 34	4 33	20 02	4 22
8	8 13 08	8 27 43	9 13 32	10 0 56	10 19 51	11 9 40	11 29 20	0 17 52	1 4 49	1 20 17	2 4 36
9	13 22	27 58	13 49	1 14	20 10	10 00	29 39	18 10	5 06	20 32	4 50
10	13 36	28 13	14 06	1 32	20 29	10 20	11 29 58	18 27	5 22	20 47	5 04
11	13 50	28 28	14 22	1 50	20 48	10 39	0 0 17	18 44	5 38	21 01	5 17
12	8 14 04	8 28 43	9 14 39	10 2 08	10 21 08	11 10 59	0 0 37	0 19 02	1 5 54	1 21 16	2 5 31
13	14 18	28 58	14 56	2 27	21 28	11 19	0 56	19 20	6 10	21 31	5 45
14	14 32	29 13	15 13	2 45	21 47	11 39	1 15	19 37	6 26	21 46	6 00
15	14 46	29 29	15 29	3 03	22 07	11 59	1 34	19 55	6 42	22 00	6 14
16	8 15 01	8 29 44	9 15 46	10 3 22	10 22 27	11 12 19	0 1 53	0 20 13	1 6 58	1 22 15	2 6 27
17	15 15	8 29 59	16 03	3 41	22 47	12 39	2 13	20 31	7 14	22 30	6 41
18	15 30	9 0 14	16 20	3 59	23 06	12 58	2 32	20 48	7 29	22 45	6 55
19	15 44	0 29	16 36	4 17	23 25	13 18	2 51	21 05	7 45	22 59	7 08
20	8 15 58	9 0 45	9 16 53	10 4 36	10 23 45	11 13 38	0 3 09	0 21 23	1 8 01	1 23 14	2 7 22
21	16 12	1 01	17 10	4 55	24 05	13 58	3 28	21 41	8 17	23 29	7 36
22	16 27	1 16	17 27	5 13	24 24	14 18	3 47	21 58	8 33	23 44	7 50
23	16 41	1 31	17 44	5 32	24 44	14 38	4 06	22 15	8 49	23 58	8 03
24	8 16 55	9 1 47	9 18 01	10 5 51	10 25 04	11 14 58	0 4 25	0 22 33	1 9 05	1 24 12	2 8 16
25	17 10	2 03	18 18	6 10	25 24	15 18	4 44	22 50	9 21	24 27	8 30
26	17 24	2 18	18 35	6 28	25 44	15 37	5 03	23 08	9 36	24 42	8 44
27	17 38	2 34	18 52	6 46	26 04	15 57	5 22	23 25	9 52	24 56	8 57
28	8 17 53	9 2 50	9 19 09	10 7 05	10 26 24	11 16 17	0 5 40	0 23 42	1 10 08	1 25 10	2 9 11
29	18 07	3 06	19 26	7 24	26 44	16 37	5 59	23 59	10 24	25 24	9 25
30	18 22	3 21	19 43	7 42	27 03	16 57	6 18	24 17	10 39	25 39	9 39
31	18 36	3 36	20 00	8 01	27 23	17 17	6 37	24 34	10 54	25 53	9 52
32	8 18 50	9 3 52	9 20 18	10 8 20	10 27 43	11 17 36	0 6 55	0 24 51	1 11 10	1 26 07	2 10 06
33	19 05	4 08	20 35	8 39	28 03	17 56	7 14	25 08	11 26	26 22	10 20
34	19 19	4 24	20 53	8 58	28 22	18 16	7 32	25 25	11 41	26 37	10 34
35	19 33	4 40	21 10	9 17	28 42	18 36	7 50	25 42	11 56	26 51	10 47
36	8 19 48	9 4 55	9 21 27	10 9 36	10 29 02	11 18 56	0 8 09	0 25 59	1 12 12	1 27 05	2 11 00
37	20 03	5 11	21 45	9 54	29 22	19 16	8 28	26 16	12 28	27 19	11 14
38	20 17	5 27	22 02	10 13	10 29 42	19 36	8 47	26 33	12 43	27 34	11 28
39	20 31	5 43	22 19	10 32	11 0 02	19 55	9 05	26 50	12 58	27 48	11 41
40	8 20 46	9 5 59	9 22 37	10 10 51	11 0 22	11 20 15	0 9 24	0 27 07	1 13 14	1 28 02	2 11 54
41	21 01	6 15	22 55	11 10	0 42	20 35	9 43	27 24	13 30	28 16	12 08
42	21 16	6 30	23 12	11 29	1 01	20 54	10 01	27 41	13 45	28 31	12 22
43	21 30	6 46	23 29	11 48	1 21	21 13	10 19	27 57	14 00	28 45	12 35
44	8 21 45	9 7 02	9 23 47	10 12 07	11 1 41	11 21 33	0 10 38	0 28 14	1 14 16	1 28 59	2 12 48
45	22 00	7 18	24 05	12 26	2 01	21 53	10 57	28 31	14 31	29 13	13 02
46	22 15	7 34	24 22	12 45	2 21	22 12	11 15	28 48	14 46	29 28	13 16
47	22 29	7 50	24 39	13 04	2 41	22 32	11 33	29 04	15 01	29 42	13 29
48	8 22 44	9 8 06	9 24 58	10 13 23	11 3 01	11 22 52	0 11 52	0 29 21	1 15 17	1 29 56	2 13 42
49	22 59	8 23	25 16	13 42	3 21	23 11	12 10	29 38	15 32	2 0 10	13 56
50	23 14	8 39	25 33	14 01	3 40	23 30	12 28	0 29 55	15 47	0 24	14 10
51	23 28	8 55	25 50	14 20	4 00	23 49	12 46	1 0 11	16 02	0 38	14 23
52	8 23 43	9 9 11	9 26 08	10 14 40	11 4 20	11 24 09	0 13 04	1 0 28	1 16 17	2 0 52	2 14 36
53	23 58	9 27	26 26	14 59	4 40	24 29	13 22	0 45	16 32	1 06	14 50
54	24 13	9 43	26 43	15 18	5 00	24 48	13 40	1 01	16 47	1 21	15 04
55	24 27	9 59	27 00	15 37	5 20	25 07	13 58	1 17	17 02	1 35	15 17
56	8 24 42	9 10 15	9 27 19	10 15 57	11 5 40	11 25 27	0 14 17	1 1 34	1 17 18	2 1 49	2 15 30
57	24 57	10 32	27 37	16 17	6 00	25 47	14 35	1 51	17 33	2 03	15 44
58	25 12	10 48	27 55	16 36	6 20	26 06	14 53	2 07	17 48	2 17	15 58
59	25 27	11 04	28 13	16 55	6 40	26 25	15 11	2 23	18 03	2 31	16 11
60	8 25 42	9 11 20	9 28 31	10 17 15	11 7 00	11 26 45	0 15 29	1 2 40	1 18 18	2 2 45	2 16 24

Variation in 1 minute (60ˢ Secs.)	0-13'	0-14'	0-15'	0-16'	0-17'	0-18'	0-19'	0-20'
" in 30ˢ Secs.	7'	7'	7'	8'	9'	9'	10'	10'
" in 10ˢ Secs.	2'	2'	3'	3'	3'	3'	3'	3'

Ayanamsa correction for the required year is to be applied to the final result. Corr. for 1998 = (–) 50'; for 1999 = (–) 51'; for 2000 = (–) 52'.

Ascendant for DELHI (Latitude 28° 39' North)

For all Places in or near 28°39' N latitude.

Minute	SIDEREAL TIME 0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h
m	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′
0	2 19 16	3 2 13	3 14 59	3 27 46	4 10 42	4 23 48	5 7 00	5 20 12	6 3 18	6 16 14	6 29 01	7 11 47	7 24 44
1	19 29	2 26	15 12	27 59	10 55	24 01	7 13	20 25	3 31	16 27	29 14	12 00	24 57
2	19 42	2 39	15 25	28 12	11 09	24 15	7 27	20 38	3 44	16 40	29 27	12 13	25 11
3	19 55	2 51	15 37	28 25	11 22	24 28	7 40	20 51	3 57	16 52	29 39	12 25	25 24
4	2 20 08	3 3 04	3 15 50	3 28 38	4 11 35	4 24 41	5 7 53	5 21 04	6 4 10	6 17 05	6 29 52	7 12 38	7 25 37
5	20 21	3 17	16 03	28 51	11 48	24 54	8 06	21 17	4 23	17 18	7 0 05	12 51	25 50
6	20 35	3 30	16 16	29 04	12 01	25 07	8 19	21 31	4 36	17 31	0 18	13 04	26 04
7	20 48	3 42	16 28	29 17	12 14	25 20	8 32	21 44	4 49	17 43	0 30	13 16	26 17
8	2 21 01	3 3 55	3 16 41	3 29 29	4 12 27	4 25 33	5 8 45	5 21 57	6 5 02	6 17 56	7 0 43	7 13 29	7 26 30
9	21 14	4 08	16 54	29 42	12 40	25 46	8 58	22 10	5 15	18 09	0 56	13 42	26 43
10	21 27	4 21	17 07	3 29 55	12 53	26 00	9 12	22 24	5 28	18 22	1 09	13 55	26 57
11	21 40	4 33	17 19	4 0 07	13 06	26 13	9 25	22 37	5 41	18 35	1 21	14 08	27 10
12	2 21 53	3 4 46	3 17 32	4 0 20	4 13 19	4 26 26	5 9 38	5 22 50	6 5 54	6 18 48	7 1 34	7 14 21	7 27 23
13	22 06	4 59	17 45	0 33	13 32	26 39	9 52	23 03	6 07	19 01	1 47	14 34	27 36
14	22 19	5 12	17 58	0 46	13 45	26 53	10 06	23 16	6 20	19 14	2 00	14 47	27 50
15	22 32	5 25	18 10	0 59	13 58	27 06	10 19	23 29	6 33	19 26	2 12	14 59	28 03
16	2 22 45	3 5 38	3 18 23	4 1 12	4 14 11	4 27 19	5 10 32	5 23 42	6 6 46	6 19 39	7 2 25	7 15 12	7 28 16
17	22 58	5 51	18 36	1 25	14 24	27 32	10 45	23 55	6 59	19 52	2 38	15 25	28 29
18	23 11	6 04	18 49	1 38	14 38	27 46	10 59	24 09	7 12	20 05	2 51	15 38	28 43
19	23 24	6 16	19 01	1 51	14 51	27 59	11 12	24 22	7 25	20 18	3 03	15 51	28 56
20	2 23 37	3 6 29	3 19 14	4 2 04	4 15 04	4 28 12	5 11 25	5 24 35	6 7 38	6 20 31	7 3 16	7 16 04	7 29 09
21	23 50	6 42	19 27	2 17	15 17	28 25	11 38	24 48	7 51	20 44	3 29	16 17	29 22
22	24 03	6 55	19 40	2 30	15 30	28 39	11 51	25 01	8 04	20 57	3 42	16 30	29 36
23	24 16	7 07	19 52	2 42	15 43	28 52	12 04	25 14	8 16	21 09	3 54	16 42	7 29 49
24	2 24 29	3 7 20	3 20 05	4 2 55	4 15 56	4 29 05	5 12 17	5 25 27	6 8 29	6 21 22	7 4 07	7 16 55	8 0 02
25	24 42	7 33	20 18	3 08	16 09	29 18	12 30	25 40	8 42	21 35	4 20	17 08	0 15
26	24 55	7 46	20 31	3 21	16 22	29 31	12 44	25 54	8 55	21 48	4 33	17 21	0 29
27	25 08	7 58	20 43	3 34	16 35	29 44	12 57	26 07	9 08	22 00	4 45	17 34	0 42
28	2 25 21	3 8 11	3 20 56	4 3 47	4 16 48	4 29 57	5 13 10	5 26 20	6 9 21	6 22 13	7 4 58	7 17 47	8 0 56
29	25 34	8 24	21 09	4 00	17 01	5 0 10	13 23	26 33	9 34	22 26	5 11	18 00	1 09
30	25 47	8 37	21 22	4 13	17 14	0 24	13 37	26 46	9 47	22 39	5 24	18 13	1 23
31	26 00	8 49	21 34	4 26	17 27	0 37	13 50	26 59	10 00	22 51	5 36	18 36	1 36
32	2 26 13	3 9 02	3 21 47	4 4 39	4 17 40	5 0 50	5 14 03	5 27 12	6 10 13	6 23 04	7 5 49	7 18 39	8 1 49
33	26 26	9 15	22 00	4 52	17 53	1 03	14 16	27 25	10 26	23 17	6 02	18 52	2 02
34	26 39	9 28	22 13	5 05	18 07	1 17	14 29	27 38	10 39	23 30	6 15	19 05	2 16
35	26 52	9 40	22 25	5 18	18 20	1 30	14 42	27 51	10 52	23 42	6 27	19 18	2 29
36	2 27 05	3 9 53	3 22 38	4 5 31	4 18 33	5 1 43	5 14 55	5 28 04	6 11 05	6 23 55	7 6 40	7 19 31	8 2 43
37	27 18	10 06	22 51	5 44	18 46	1 56	15 08	28 17	11 18	24 08	6 53	19 44	2 56
38	27 31	10 19	23 04	5 57	18 59	2 09	15 22	28 30	11 31	24 21	7 06	19 57	3 10
39	27 43	10 31	23 16	6 09	19 12	2 22	15 35	28 43	11 43	24 33	7 18	20 10	3 23
40	2 27 56	3 10 44	3 23 29	4 6 22	4 19 25	5 2 35	5 15 48	5 28 56	6 11 56	6 24 46	7 7 31	7 20 23	8 3 37
41	28 09	10 57	23 42	6 35	19 38	2 48	16 01	29 09	12 09	24 59	7 44	20 36	3 50
42	28 22	11 10	23 55	6 48	19 52	3 02	16 15	29 23	12 22	25 12	7 57	20 49	4 04
43	28 35	11 22	24 08	7 01	20 05	3 15	16 28	29 36	12 35	25 24	8 09	21 02	4 18
44	2 28 48	3 11 35	3 24 21	4 7 14	4 20 18	5 3 28	5 16 41	5 29 49	6 12 48	6 25 37	7 8 22	7 21 15	8 4 32
45	29 01	11 48	24 34	7 27	20 31	3 41	16 54	6 0 02	13 01	25 50	8 35	21 28	4 45
46	29 14	12 01	24 47	7 40	20 44	3 55	17 08	0 15	13 14	26 03	8 48	21 41	4 59
47	29 26	12 13	24 59	7 53	20 57	4 08	17 21	0 28	13 27	26 15	9 00	21 54	5 12
48	2 29 39	3 12 26	3 25 12	4 8 06	4 21 10	5 4 22	5 17 34	6 0 41	6 13 40	6 26 28	7 9 14	7 22 07	8 5 26
49	2 29 52	12 39	25 25	8 19	21 23	4 35	17 47	0 54	13 53	26 41	9 27	22 20	5 39
50	3 0 05	12 52	25 38	8 32	21 37	4 49	18 01	1 07	14 06	26 54	9 40	22 33	5 53
51	0 18	13 04	25 51	8 45	21 50	5 02	18 14	1 20	14 18	27 06	9 52	22 46	6 07
52	3 0 31	3 13 17	3 26 04	4 8 58	4 22 03	5 5 15	5 18 27	6 1 33	6 14 31	6 27 19	7 10 05	7 22 59	8 6 21
53	0 44	13 30	26 17	9 11	22 16	5 28	18 40	1 46	14 44	27 32	10 18	23 12	6 34
54	0 57	13 43	26 30	9 24	22 30	5 41	18 53	1 59	14 57	27 45	10 31	23 26	6 48
55	1 09	13 55	26 42	9 37	22 43	5 54	19 06	2 12	15 09	27 57	10 43	23 39	7 02
56	3 1 22	3 14 08	3 26 55	4 9 50	4 22 56	5 6 07	5 19 19	6 2 25	6 15 22	6 28 10	7 10 56	7 23 52	8 7 16
57	1 35	14 21	27 08	10 03	23 09	6 20	19 32	2 38	15 35	28 23	11 09	24 05	7 29
58	1 48	14 34	27 21	10 16	23 22	6 34	19 46	2 52	15 48	28 36	11 22	24 18	7 43
59	2 00	14 46	27 33	10 29	23 35	6 47	19 59	3 05	16 01	28 48	11 34	24 31	7 57
60	3 2 13	3 14 59	3 27 46	4 10 42	4 23 48	5 7 00	5 20 12	6 3 18	6 16 14	6 29 01	7 11 47	7 24 44	8 8 11

Ascendant for DELHI (Latitude 28°39' North)

For all Places in or near 28°39' N latitude.

Minute	SIDEREAL TIME										
	13*h*	14*h*	15*h*	16*h*	17*h*	18*h*	19*h*	20*h*	21*h*	22*h*	23*h*
m	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′	s ° ′
0	8 8 11	8 22 34	9 8 23	9 26 05	10 15 51	11 7 00	11 28 09	0 17 55	1 5 37	1 21 26	2 5 49
1	8 25	22 51	8 40	26 24	16 12	7 22	28 30	18 14	5 54	21 41	6 03
2	8 39	23 06	8 57	26 43	16 33	7 43	28 51	18 33	6 11	21 56	6 17
3	8 52	23 20	9 13	27 02	16 53	8 04	29 11	18 51	6 27	22 10	6 30
4	8 9 06	8 23 35	9 9 30	9 27 21	10 17 14	11 8 26	11 29 32	0 19 10	1 6 44	1 22 25	2 6 44
5	9 20	23 50	9 47	27 40	17 35	8 47	11 29 52	19 29	7 01	22 40	6 58
6	9 34	24 05	10 04	27 59	17 56	9 08	0 0 13	19 47	7 17	22 55	7 12
7	9 48	24 20	10 20	28 18	18 16	9 29	0 33	20 05	7 33	23 10	7 25
8	8 10 02	8 24 35	9 10 37	9 28 37	10 18 37	11 9 51	0 0 54	0 20 24	1 7 50	1 23 25	2 7 39
9	10 16	24 50	10 54	28 56	18 58	10 13	1 14	20 42	8 07	23 40	7 53
10	10 30	25 05	11 11	29 15	19 19	10 34	1 35	21 00	8 23	23 55	8 07
11	10 44	25 21	11 28	29 34	19 39	10 55	1 55	21 18	8 39	24 09	8 20
12	8 10 58	8 25 36	9 11 45	9 29 53	10 20 00	11 11 17	0 2 15	0 21 37	1 8 55	1 24 24	2 8 34
13	11 12	25 52	12 02	10 0 12	20 21	11 39	2 35	21 55	9 11	24 39	8 48
14	11 27	26 07	12 20	0 31	20 42	12 00	2 56	22 13	9 27	24 54	9 02
15	11 41	26 22	12 37	0 50	21 03	12 21	3 16	22 31	9 43	25 08	9 15
16	8 11 55	8 26 38	9 12 54	10 1 10	10 21 24	11 12 43	0 3 36	0 22 50	1 10 00	1 25 23	2 9 28
17	12 09	26 54	13 12	1 29	21 45	13 04	3 56	23 08	10 16	25 38	9 42
18	12 23	27 09	13 29	1 48	22 06	13 25	4 17	23 26	10 32	25 53	9 56
19	12 37	27 24	13 46	2 07	22 27	13 46	4 37	23 44	10 48	26 07	10 09
20	8 12 51	8 27 40	9 14 04	10 2 27	10 22 48	11 14 08	0 4 57	0 24 03	1 11 05	1 26 21	2 10 23
21	13 05	27 56	14 21	2 47	23 09	14 30	5 17	24 21	11 21	26 36	10 37
22	13 20	28 11	14 39	3 06	23 30	14 51	5 37	24 39	11 37	26 51	10 51
23	13 34	28 26	14 56	3 25	23 51	15 12	5 57	24 57	11 53	27 05	11 04
24	8 13 48	8 28 42	9 15 13	10 3 44	10 24 12	11 15 34	0 6 17	0 25 15	1 12 09	1 27 19	2 11 17
25	14 02	28 58	15 31	4 04	24 33	15 55	6 37	25 33	12 25	27 34	11 30
26	14 17	29 13	15 49	4 24	24 54	16 16	6 57	25 51	12 40	27 49	11 44
27	14 31	29 28	16 07	4 44	25 15	16 37	7 17	26 09	12 56	28 03	11 57
28	8 14 45	8 29 44	9 16 24	10 5 04	10 25 37	11 16 58	0 7 37	0 26 26	1 13 12	1 28 17	2 12 11
29	15 00	9 0 00	16 42	5 24	25 58	17 19	7 57	26 44	13 28	28 32	12 24
30	15 15	0 16	16 59	5 44	26 19	17 40	8 17	27 01	13 43	28 47	12 38
31	15 29	0 31	17 16	6 04	26 40	18 01	8 37	27 19	13 59	29 01	12 51
32	8 15 43	9 0 47	9 17 34	10 6 23	10 27 02	11 18 23	0 8 56	0 27 36	1 14 15	1 29 15	2 13 04
33	15 58	1 03	17 52	6 43	27 23	18 44	9 16	27 54	14 31	29 29	13 17
34	16 13	1 19	18 10	7 03	27 44	19 05	9 35	28 12	14 46	29 43	13 31
35	16 27	1 35	18 28	7 23	28 05	19 26	9 54	28 30	15 02	1 29 57	13 44
36	8 16 41	9 1 51	9 18 45	10 7 43	10 28 27	11 19 48	0 10 14	0 28 47	1 15 18	2 0 12	2 13 58
37	16 56	2 07	19 03	8 03	28 48	20 09	10 33	29 04	15 34	0 26	14 11
38	17 11	2 23	19 21	8 23	29 09	20 30	10 53	29 22	15 50	0 40	14 25
39	17 25	2 39	19 39	8 43	29 30	20 51	11 12	29 39	16 04	0 54	14 38
40	8 17 39	9 2 55	9 19 57	10 9 03	10 29 52	11 21 12	0 11 32	0 29 56	1 16 20	2 1 09	2 14 51
41	17 54	3 12	20 15	9 23	11 0 13	21 33	11 52	0 14	16 36	1 23	15 04
42	18 09	3 28	20 33	9 44	0 34	21 54	12 11	0 31	16 51	1 37	15 18
43	18 23	3 44	20 52	10 04	0 55	22 15	12 30	0 0 48	17 06	1 51	15 31
44	8 18 37	9 4 00	9 21 10	10 10 24	11 1 17	11 22 36	0 12 50	1 1 06	1 17 22	2 2 05	2 15 44
45	18 52	4 17	21 29	10 44	1 39	22 57	13 09	1 23	17 38	2 19	15 57
46	19 07	4 33	21 47	11 05	2 00	23 18	13 28	1 41	17 53	2 34	16 11
47	19 21	4 49	22 05	11 25	2 21	23 39	13 47	1 58	18 08	2 48	16 24
48	8 19 36	9 5 05	9 22 23	10 11 45	11 2 43	11 24 00	0 14 07	1 2 15	1 18 24	2 3 02	2 16 37
49	19 51	5 22	22 41	12 05	3 05	24 21	14 26	2 32	18 39	3 16	16 50
50	20 06	5 38	22 59	12 26	3 26	24 42	14 45	2 49	18 54	3 30	17 04
51	20 20	5 54	23 18	12 46	3 47	25 02	15 04	3 06	19 10	3 44	17 17
52	8 20 35	9 6 10	9 23 36	10 13 06	11 4 09	11 25 23	0 15 23	1 3 23	1 19 25	2 3 58	2 17 30
53	20 50	6 27	23 55	13 26	4 30	25 44	15 42	3 40	19 40	4 12	17 43
54	21 05	6 43	24 13	13 47	4 51	26 05	16 01	3 57	19 55	4 26	17 57
55	21 20	6 59	24 31	14 07	5 12	26 25	16 20	4 13	20 10	4 40	18 10
56	8 21 35	9 7 16	9 24 50	10 14 28	11 5 34	11 26 46	0 16 39	1 4 30	1 20 25	2 4 54	2 18 23
57	21 50	7 33	25 09	14 49	5 56	27 07	16 58	4 47	20 40	5 08	18 36
58	22 05	7 50	25 27	15 10	6 17	27 28	17 17	5 04	20 55	5 22	18 50
59	22 19	8 06	25 46	15 30	6 38	27 48	17 36	5 20	21 10	5 35	19 03
60	8 22 34	9 8 23	9 26 05	10 15 51	11 7 00	11 28 09	0 17 55	1 5 37	1 21 26	2 5 49	2 19 16

Variation in 1 minute (60s Secs.)	0-13′	0-14′	0-15′	0-16′	0-17′	0-18′	0-19′	0-20′	0-21′	0-22′
" in 30s Secs.	7′	7′	8′	8′	8′	9′	10′	10′	11′	11′
" in 10s Secs.	2′	2′	2′	3′	3′	3′	3′	3′	4′	4′

Ayanamsa correction for the required year is to be applied to the final result. Corr. for 1998 = (–) 50′; for 1999 = (–) 51′; for 2000 = (–) 52′.

Solar Return or *Varsapraves*

The moment in each year when the nirayana or sidereal longitude of the Sun becomes equal to the longitude of Sun at the time of birth of the native is the moment of Solar return or *Varsapravesh.*

Short method of Calculation :- Wirte down the day of week at birth (*0 for Saturday, 1 for Sunday, etc)* and with it write the birth time reckoned from 6*h* A.M. or 0*h* Midnight or in any other system of time reckoning. Take from the following table the figures given against the age of the person (completed number of years) and add to the above. The result gives the day of week and the time of *Varsapravesh.* The English date for the table below may differ by a few minutes from that obtained from equality of logitudes of the Sun at the two epochs, this being due to the perturbations of Sun's longitude caused by the planets. Actually calculation of equality of long. of Sun will give the exact time.

Year	*d*	*h*	*m*	Year	*d*	*h*	*m*	Year	*d*	*h*	*m*
1	1	6	9.2	41	2	12	15.7	81	3	18	22.1
2	2	12	18.3	42	3	18	24.8	82	5	0	31.3
3	3	18	27.5	43	5	0	34.0	83	6	6	40.5
4	5	0	36.6	44	6	6	43.1	84	0	12	49.6
5	6	6	45.8	45	0	12	52.3	85	1	18	58.8
6	0	12	55.0	46	1	19	1.5	86	3	1	8.0
7	1	19	4.1	47	3	1	10.6	87	4	7	17.1
8	3	1	13.3	48	4	7	19.8	88	5	13	26.3
9	4	7	22.5	49	5	13	29.0	89	6	19	35.4
10	5	13	31.6	50	6	19	38.1	90	1	1	44.6
11	6	19	40.8	51	1	1	47.3	91	2	7	53.8
12	1	1	49.9	52	2	7	56.4	92	3	14	2.9
13	2	7	59.1	53	3	14	5.6	93	4	20	12.1
14	3	14	8.3	54	4	20	14.8	94	6	2	21.3
15	4	20	17.4	55	6	2	23.9	95	0	8	30.4
16	6	2	26.6	56	0	8	33.1	96	1	14	39.6
17	0	8	35.8	57	1	14	42.3	97	2	20	48.7
18	1	14	44.9	58	2	20	51.4	98	4	2	57.9
19	2	20	54.1	59	4	3	0.6	99	5	9	7.1
20	4	3	3.2	60	5	9	9.7	100	6	15	16.2
21	5	9	12.4	61	6	15	18.9	101	0	21	25.4
22	6	15	21.6	62	0	21	28.1	102	2	3	34.5
23	0	21	30.7	63	2	3	37.2	103	3	9	43.7
24	2	3	39.9	64	3	9	46.4	104	4	15	52.8
25	3	9	49.1	65	4	15	55.6	105	5	22	2.0
26	4	15	58.2	66	5	22	4.7	106	0	4	11.2
27	5	22	7.4	67	0	4	13.9	107	1	10	20.3
28	0	4	16.5	68	1	10	23.0	108	2	16	29.5
29	1	10	25.7	69	2	16	32.2	109	3	22	38.7
30	2	16	34.9	70	3	22	41.4	110	5	4	47.8
31	3	22	44.0	71	5	4	50.5	111	6	10	57.0
32	5	4	53.2	72	6	10	59.7	112	0	17	6.1
33	6	11	2.4	73	0	17	8.9	113	1	23	15.3
34	0	17	11.5	74	1	23	18.0	114	3	5	24.5
35	1	23	20.7	75	3	5	27.2	115	4	11	33.6
36	3	5	29.8	76	4	11	36.3	116	5	17	42.8
37	4	11	39.0	77	5	17	45.5	117	6	23	52.0
38	5	17	48.2	78	6	23	54.7	118	1	6	1.1
39	6	23	57.3	79	1	6	3.8	119	2	12	10.3
40	1	6	6.5	80	2	12	13.0	120	3	18	19.4

Example : A child is born on Sept. 16,1961, Saturday at 16*h* 7*m* I.S.T, when the nirayana longitude of the Sun was 5^{s} 0°0'. What will be the moment of solar return on Sept.16,1999, Thursday ? (1) Weekday on Sept.16,1961 was Saturday (= 0). (2) completed number of years of the nativity is 38. As per above Table, against the year 38, we get (3) 5*d* 17*h* 48.2*m*. Adding to the weekday 0 with 5 as obtained from the Table, we get 5 *i.e.* Thursday, and then adding 17*h* 48*m* to birthtime 16*h* 7*m*, we get 9*h* 55*m* of Aug. 17, 1999 (Actual time is 9*h* 54*m*) , when the longitude of Sun is 5^{s} 0°0'.

Perpetual Calendar

(Based on *The Tables of the Sun* by N. C. Lahiri)

Century	JulianDay Number	Week day Index	Century	JulianDay Number	Week day Index	Century	JulianDay Number	Week day Index	Century	JulianDay Number	Week day Index
A.D. J	*d*		A.D. J	*d*		A.D. J	*d*		A.D. J	*d*	
–3200	552258	1	–1800	1063608	1	–400	1574958	1	1000	2086308	1
–3100	588783	0	–1700	1100133	0	–300	1611483	0	1100	2122833	0
–3000	625308	6	–1600	1136658	6	–200	1648008	6	1200	2159358	6
–2900	661833	5	–1500	1173183	5	–100	1684533	5	1300	2195883	5
–2800	698358	4	–1400	1209708	4	0	1721058	4	1400	2232408	4
–2700	734883	3	–1300	1246233	3	100	1757583	3	J 1500	2268933	3
–2600	771408	2	–1200	1282758	2	200	1794108	2	G		
–2500	807933	1	–1100	1319283	1	300	1830633	1	1500	2268923	0
–2400	844458	0	–1000	1355808	0	400	1867158	0	1600	2305448	6
–2300	880983	6	–900	1392333	6	500	1903683	6	1700	2341972	4
–2200	917508	5	–800	1428858	5	600	1940208	5	1800	2378496	2
–2100	954033	4	–700	1465383	4	700	1976733	4	1900	2415020	0
–2000	990558	3	–600	1501908	3	800	2013258	3	2000	2451545	6
–1900	1027083	2	–500	1538433	2	900	2049783	2	2100	2488069	4

J = Julian Calendar ; G = Gregorian Calendar

***Rules for finding* Day of Week**

The Weekday for any day of the year may be ascertained as follows :—

Rule :-Index for the century from the above table + Last two figures of the year + $\frac{1}{4}$th of it (ignoring the remainder) = Y

Y + index for the month + date = Total.

Divide the total by 7 and take the remainder which indicates the day of week, *viz.* if the remainder is 0 it is Saturday, 1 Sunday, 2 Monday, 3 Tuesday, 4 Wednesday, 5 Thursday, 6 Friday.

INDEX FOR THE MONTH

January = 1 (0 for a leap year)	April = 0	July = 0	October = 1
February = 4 (3 for a leap year)	May = 2	August = 3	November = 4
March = 4	June = 5	September = 6	December = 6

The Julian Calendar was established in the Roman Empire by Julius Caesar in 46 B.C. by revising the previous local calendars of Rome. In 1582, Pope Gregory XIII revised the calendar and ordained that Friday, October 5 of that year was to be counted as Friday, October 15.

In Great Britain 3rd Sept. 1752, Thursday of Julian Calendar was designated as 14th September, 1752, Thursday of Gregorian Calandar as the error in the Calendar then accumulated to 11 days.

***Example : 1* - To find the weekday of September 3, 1752 of Julian Calendar.**

Index for the Century 1700 of Julian Calendar is 1, which can be found out by extrapolation from the above table. Index for the century is 1+last two figures of the year is 52+$\frac{1}{4}$ th of 52+ date 3 + Index for month 6. = 75. Dividing by 7, the remainder is 5, which is **Thursday**.

***Example : 2* - To find the weekday of September 14, 1752 of Gregorian Calendar.**

Index for the Century is 4 + last two figure of the year is 52 + 13 (1/4th of 52) + 6 (Index for the month) +14 (date)=89. Dividing by 7, the remainder is 5, which is **Thursday**.

***Example : 3* - To find the weekday of January 1, 1999.** In a similar way the weekday of Jan 1, 1999 is found to be Friday. [0+99+24+1+1] =125 ; Dividing 125 by 7, the remainder is 6, which is **Friday**.

METHOD FOR CASTING OF BIRTH CHART

According to Indian System

For erecting a birth chart of any nativity three items are mainly required *viz.*, date of birth, place of birth and time of birth. The time is required either in local mean time of the place or the present I.S.T. The local time was in vogue all over India before 1st January, 1906. From 1st September, 1947 the use of L.M.T was completely abandoned and I.S.T was adopted for all places of India (*vide* Explanatory note on Time changes in India). ***L.M.T*** will have to be used in calculating the Ascendant (*lagna*) and ***I.S.T*** is to be used for determining the positions of planets.

In some cases the time of birth is supplied in *ghati* (*danda* or *nadika*) and *vighati* (*pala or vinadika).* In that case convert *ghati* and *vighati* in hours and minutes applying the relation that 24 minutes make one *ghati* and 24 secs. make one *vighati* and add the result to the sunrise time or to the sunset time when the *ghati* and *vigahati* is given from sunset in case of birth in night. In this way the birth time is obtained in hours and minutes of the clock. But before that one should be sure that the available sunrise or sunset time is not in L.M.T. nor in Local apparent time, but in I.S.T. In the former case obtain the sunrise time for the date and locality in question in I.S.T. by calculation and then obtain the birth time which is then in I.S.T. Table for conversion of time into L.M.T. from I.S.T. and *vice-versa* has been given in the Ephemeris. Both L.M.T. and I.S.T. would be required in the preparation of horoscope. So keep both the times recorded in the working sheet. For the birth place obtain the latitude and longitude measured from Greenwich. If the exact value of these co-ordinate (*i.e.* lat. and long. of the place) are not known, then work with those of the nearest city available from some standard Atlas. The longitude will be utilised in finding the local time of place and the latitude in determining the *lagna* or Ascendant. From the longitude of the place the local time is determined (*vide* Table showing Lat, Long. and Local time of Places).

Many foreign countries keep Summer Time, *i,e,* they advance their clocks by one hour during summer seasons. In that case the recorded birth time should be reduced by one hour to obtain local standard time of birth. From that time obtain I.S.T. by correction given in Lahiri's *Tables of Ascendants* or *Indian Ephemeris.* From the same book calculate the Sidereal Time at birth and obtain the Ascendant or *Lagna* for the place. Example for finding the *Lagna* and *Dasama* (10th House) has been given elsewhere in this Ephemeris.

Then calculate the longitude of planets according to Indian Standard Time. The longitudes are given in signs (*Rasis*), degrees and minutes. 60 minutes make one degree and 30 degrees make one *rasi,* From I.S.T. as obtained or derived for the birth time, calculate the longitudes of planet (*grahasphuta*). The longitudes are given for 5-30 a.m. I.S.T. in the yearly Ephemeris. If the birth time be exactly 5-30 a.m. or very near to it, then take the given longitudes as those for birth. The method of calculating the longitudes for any hour of I.S.T. has also been illustrated in the Example given in the Ephemeris. For this different tables have been given and the use of the log. tables has been illustrated. For calculation of ascendant and planetary positions of a Foreign City, the method has also separately been shown.

Now the planets and the *lagna* are to be placed in the birth chart. Thereafter *Navamsa* chart can be prepared from the Table of *Navamsa* as given in this ephemeris. The first figure in the longitude of a planet indicate the *Rasi* or sign. For example, if it is zero, place the planet in *Mesha or* Aries, if 1 place it in *Vrisha* or Taurus, 2 in *Mithuna* or Gemini, 3 in *Karkata* or Cancer and so on. The Ascendant or *Lagna* will have to be placed in the birth chart in a similar way. This completes casting of the nativity. The nakshatra division in which the Moon or the planet falls can be ascertained from the table given for the purpose. The *tithi* at birth time can be determined from the difference of longitude of the Moon and Sun. For *Yoga* add the longitude of Sun to that of Moon and consult the table of Yoga from which the number of *Yoga* current at birth time would be obtained. Then the *balance of dasa* is to be calculated. For this take the longitude of Moon and enter the table on the Balance of Vimsottari dasa at the time of birth or Astottari Dasa as is required. Then go on adding the period of dasa of subsequent planets as required. The longitude utilised for all the above purposes are the *nirayana* longitude as given in the Ephemeris. If ayanamsa is added to the *nirayana* longitude, then the Sayana longitude of the planet will be obtained which are, however, not required in casting of a nativity in the Indian system.

REDUCTION OF LOCAL MEAN TIME OF A PLACE INTO THE INDIAN STANDARD TIME ACCORDING TO LONGITUDE OF PLACE

CORRECTION TO BE ADDED TO L.M.T. TO OBTAIN I.S.T.

	Longitude of Place (East of Greenwich)															
	67°	68°	69°	70°	71°	72°	73°	74°	75°	76°	77°	78°	79°	80°	81°	82°
'	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
0	62.0	58.0	54.0	50.0	46.0	42.0	38.0	34.0	30.0	26.0	22.0	18.0	14.0	10.0	6.0	2.0
3	61.8	57.8	53.8	49.8	45.8	41.8	37.8	33.8	29.8	25.8	21.8	17.8	13.8	9.8	5.8	1.8
6	61.6	57.6	53.6	49.6	45.6	41.6	37.6	33.6	29.6	25.6	21.6	17.6	13.6	9.6	5.6	1.6
9	61.4	57.4	53.4	49.4	45.4	41.4	37.4	33.4	29.4	25.4	21.4	17.4	13.4	9.4	5.4	1.4
12	61.2	57.2	53.2	49.2	45.2	41.2	37.2	33.2	29.2	25.2	21.2	17.2	13.2	9.2	5.2	1.2
15	61.0	57.0	53.0	49.0	45.0	41.0	37.0	33.0	29.0	25.0	21.0	17.0	13.0	9.0	5.0	1.0
18	60.8	56.8	52.8	48.8	44.8	40.8	36.8	32.8	28.8	24.8	20.8	16.8	12.8	8.8	4.8	0.8
21	60.6	56.6	52.6	48.6	44.6	40.6	36.6	32.6	28.6	24.6	20.6	16.6	12.6	8.6	4.6	0.6
24	60.4	56.4	52.4	48.4	44.4	40.4	36.4	32.4	28.4	24.4	20.4	16.4	12.4	8.4	4.4	0.4
27	60.2	56.2	52.2	48.2	44.2	40.2	26.2	32.2	28.2	24.2	20.2	16.2	12.2	8.2	4.2	0.2
30	60.0	56.0	52.0	48.0	44.0	40.0	36.0	32.0	28.0	24.0	20.0	16.0	12.0	8.0	4.0	0.0
33	59.8	55.8	51.8	47.8	43.8	39.8	35.8	31.8	27.8	23.8	19.8	15.8	11.8	7.8	3.8	
36	59.6	55.6	51.6	47.6	43.6	39.6	35.6	31.6	27.6	23.6	19.6	15.6	11.6	7.6	3.6	
39	59.4	55.4	51.4	47.4	43.4	39.4	35.4	31.4	27.4	23.4	19.4	15.4	11.4	7.4	3.4	
42	59.2	55.2	51.2	47.2	43.2	39.2·	35.2	31.2	27.2	23.2	19.2	15.2	11.2	7.2	3.2	
45	59.0	55.0	51.0	47.0	43.0	39.0	35.0	31.0	27.0	23.0	19.0	15.0	11.0	7.0	3.0	
48	58.8	54.8	50.8	46.8	42.8	38.8	34.8	30.8	26.8	22.8	18.8	14.8	10.8	6.8	2.8	
51	58.6	54.6	50.6	46.6	42.6	36.6	34.6	30.6	26.6	22.6	18.6	14.6	10.6	6.6	2.6	
54	58.4	54.4	50.4	46.4	42.4	38.4	34.4	30.4	26.4	22.4	18.4	14.4	10.4	6.4	2.4	
57	58.2	54.2	50.2	46.2	42.2	38.2	34.2	30.2	26.2	22.2	18.2	14.2	10.2	6.2	2.2	
60	58.0	54.0	50.0	46.0	42.0	38.0	34.0	30.0	26.0	22.0	18.0	14.0	10.0	6.0	2.0	

CORRECTION TO BE SUBTRACTED TO L.M.T. TO OBTAIN I.S.T.

	Longitude of Place (East of Greenwich)															
	82°	83°	84°	85°	86°	87°	88°	89°	90°	91°	92°	93°	94°	95°	96°	97°
'	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
0		2.0	6.0	10.0	14.0	18.0	22.0	26.0	30.0	34.0	38.0	42.0	46.0	50.0	54.0	58.0
3		2.2	6.2	10.2	14.2	18.2	22.2	26.2	30.2	34.2	38.2	42.2	46.2	50.2	54.2	58.2
6		2.4	6.4	10.4	14.4	18.4	22.4	26.4	30.4	34.4	38.4	42.4	46.4	50.4	54.4	58.4
9		2.6	6.6	10.6	14.6	18.6	22.6	26.6	30.6	34.6	38.6	42.6	46.6	50.6	54.6	58.6
12		2.8	6.8	10.8	14.8	18.8	22.8	26.8	30.8	34.8	38.8	42.8	46.8	50.8	54.8	58.8
15		3.0	7.0	11.0	15.0	19.0	23.0	27.0	31.0	35.0	39.0	43.0	47.0	51.0	55.0	59.0
18		3.2	7.2	11.2	15.2	19.2	23.2	27.2	31.2	35.2	39.2	43.2	47.2	51.2	55.2	59.2
21		3.4	7.4	11.4	15.4	19.4	23.4	27.4	31.4	35.4	39.4	43.4	47.4	51.4	55.4	59.4
24		3.6	7.6	11.6	15.6	19.6	23.6	27.6	31.6	35.6	39.6	43.6	47.6	51.6	55.6	59.6
27		3.8	7.8	11.8	15.8	19.8	23.8	27.8	31.8	35.8	39.8	43.8	47.8	51.8	55.8	59.8
30	0.0	4.0	8.0	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0	44.0	48.0	52.0	56.0	60.0
33	0.2	4.2	8.2	12.2	16.2	20.2	24.2	28.2	32.2	36.2	40.2	44.2	48.2	52.2	56.2	60.2
36	0.4	4.4	8.4	12.4	16.4	20.4	24.4	28.4	32.4	36.4	40.4	44.4	48.4	52.4	56.4	60.4
39	0.6	4.6	8.6	12.6	16.6	20.6	24.6	28.6	32.6	36.6	40.6	44.6	48.6	52.6	56.6	60.6
42	0.8	4.8	8.8	12.8	16.8	20.8	24.8	28.8	32.8	36.8	40.8	44.8	48.8	52.8	56.8	60.8
45	1.0	5.0	9.0	13.0	17.0	21.0	25.0	29.0	33.0	37.0	41.0	45.0	49.0	53.0	57.0	61.0
48	1.2	5.2	9.2	13.2	17.2	21.2	25.2	29.2	33.2	37.2	41.2	45.2	49.2	53.2	57.2	61.2
51	1.4	5.4	9.4	13.4	17.4	21.4	25.4	29.4	33.4	37.4	41.4	45.4	49.4	53.4	57.4	61.4
54	1.6	5.6	9.6	13.6	17.6	21.6	25.6	29.6	33.6	37.6	41.6	45.6	49.6	53.6	57.6	61.6
57	1.8	5.8	9.8	13.8	17.8	21.8	25.8	29.8	33.8	37.8	41.8	45.8	49.8	53.8	57.8	61.8
60	2.0	6.0	10.0	14.0	18.0	22.0	26.0	30.0	34.0	38.0	42.0	46.0	50.0	54.0	58.0	62.0

Latitude, Longitude and Local Time corrections of principal cities in India

The following table gives the latitude and longitude of principal cities along with the Local Time correction, *viz*, the reduction of Indian Standard Time to get the corresponding local mean time of the place. The local mean time (L.M.T.) is required in determining the sidereal time of a moment which is utilised in finding the Ascendant *(lagna)* and the tenth house *(Dasama)*.

The corrections in the last column when applied to the sidereal time as obtained in the daily Ephemeris will give the sidereal time for 12*h* noon L.M.T. of the place in question. When the Greenwich time for any day is available, the corrections are to be diminished by 54 secs. before applying the same to the Greenwich sidereal time.

PLACE		Latitude North		Longitude East		Local Time Correction L.M.T. from I.S.T		Corr. to *Indian* Sid. Time	
		°	'	°	'	m	s	m	s
Adilabad ...	Andhra P.	19	37	78	30	− 16	00	+ 0	03
Adoni ...	Andhra P.	15	38	77	19	− 20	44	+ 0	03
Agartala ...	Tripura	23	49	91	17	+ 35	08	− 0	06
Agra ...	U.P.	27	11	78	02	− 17	52	+ 0	03
Ahmedabad ...	Gujarat	23	02	72	36	− 39	36	+ 0	07
Ahmednagar ...	Maharastra	19	05	74	48	− 30	48	+ 0	05
Aijawl ...	Mizoram	23	44	92	45	+ 41	00	− 0	07
Ajanta ...	Maharastra	20	33	75	48	− 26	48	+ 0	04
Ajmer ...	Rajasthan	26	27	74	38	− 31	28	+ 0	05
Akola ...	Maharastra	20	42	77	02	− 21	52	+ 0	04
Aligarh ...	U.P.	27	54	78	04	− 17	44	+ 0	03
Alipurduar ...	W.B.	26	28	89	32	+ 28	08	− 0	05
Allahabad ...	U.P.	25	28	81	52	− 2	32	+ 0	00
Alleppy ...	Kerala	9	30	76	23	− 24	28	+ 0	04
Almora ...	U.P.	29	36	79	40	− 11	20	+ 0	02
Alwar ...	Rajasthan	27	34	76	38	− 23	28	+ 0	04
Amarkantak ...	M.P.	22	40	81	45	− 3	00	+ 0	0
Amaravati ...	Maharastra	20	56	77	45	− 19	00	+ 0	03
Ambala ...	Haryana	30	23	76	46	− 22	56	+ 0	04
Amber ...	Rajasthan	26	59	75	52	− 26	32	+ 0	04
Ambikapur ...	M.P.	23	07	83	11	+ 2	44	− 0	00
Amingaon ...	Assam	26	12	91	42	+ 36	48	− 0	06
Amlapuram ...	Andhra P.	16	35	82	01	− 1	56	+ 0	00
Amreli ...	Gujarat	21	36	71	15	− 45	00	+ 0	07
Amritsar ...	Punjab	31	38	74	53	− 30	28	+ 0	05
Anakapalle ...	Andhra P.	17	41	83	01	+ 2	04	− 0	00
Anamalai ...	Tamil Nadu	10	38	76	50	− 22	40	+ 0	04
Anand ...	Gujarat	22	32	73	00	− 38	00	+ 0	06
Anantapur ...	Andhra P.	14	41	77	37	− 19	32	+ 0	03
Angul ...	Orissa	20	48	85	01	+ 10	04	− 0	02
Arambag ...	W.B.	23	53	87	47	+ 21	08	− 0	04
Arcot ...	Tamil Nadu	12	56	79	24	− 12	24	+ 0	02
Arrah ...	Bihar	25	33	84	40	+ 8	40	− 0	01
Arvi ...	Maharastra	20	59	78	14	− 17	04	+ 0	03
Asansol ...	W.B.	23	42	86	58	+ 17	52	− 0	03
Aurangabad ...	Maharastra	19	52	75	18	− 28	48	+ 0	05
Ayodhya ...	U.P.	26	48	82	14	− 1	04	+ 0	00
Azamgarh ...	U.P.	26	03	83	13	+ 2	52	− 0	00
Baidyanath ... Dham (Deoghar)	Bihar	24	29	86	43	+ 16	52	− 0	03

Latitude, Longitude and Local Time corrections of principal cities in India

PLACE		Latitude North °	'	Longitude East °	'	Local Time Correction L.M.T. from I.S.T m	s	Corr. to *Indian* Sid. Time m	s
Badrinath ...	U.P.	30	44	79	32	− 11	52	+ 0	02
Balasore ...	Orissa	21	30	86	55	+ 17	40	− 0	03
Ballia ...	U.P.	25	44	84	11	+ 6	44	− 0	01
Balurghat ...	W.B.	25	14	88	47	+ 25	08	− 0	04
Banda ...	U.P.	25	20	80	22	− 8	32	+ 0	01
Bangalore ...	Karnataka	12	58	77	36	− 19	36	+ 0	02
Bankura ...	W.B.	23	14	87	04	+ 18	16	− 0	03
Bapatla ...	Andhra P.	15	54	80	30	− 8	00	+ 0	01
Barasat ...	W.B.	22	43	88	29	+ 23	56	− 0	04
Bara Banki ...	U.P.	26	56	81	13	− 5	08	+ 0	01
Barauni ...	Bihar	25	29	85	59	+ 13	56	− 0	02
Bardhaman ...	W.B.	23	15	87	54	+ 21	36	− 0	04
Bareilly ...	U.P.	28	21	79	23	− 12	28	+ 0	02
Baripada ...	Orissa	21	56	86	44	+ 16	56	− 0	03
Baroda ...	Gujarat	22	18	73	13	− 37	08	+ 0	06
Barpeta ...	Assam	26	20	91	02	+ 34	08	− 0	06
Barrackpur ...	W.B.	22	46	88	24	+ 23	36	− 0	04
Basirhat ...	W.B.	22	40	88	52	+ 25	28	− 0	04
Batanagar ...	W.B.	22	31	88	15	+ 23	00	− 0	04
Begusarai ...	Bihar	25	25	86	08	+ 4	32	− 0	02
Belgaum ...	Karnataka	15	52	74	32	− 31	52	+ 0	05
Bellary ...	Karnataka	15	10	76	56	− 22	16	+ 0	04
Berhampur ...	Orissa	19	18	84	51	+ 9	24	− 0	02
Bhadrachalam ...	Andhra P.	17	40	80	53	− 6	28	+ 0	01
Bhadrak ...	Orissa	21	08	86	33	+ 16	12	− 0	03
Bhadravati ...	Karnataka	13	52	75	40	− 27	20	+ 0	04
Bhagalpur ...	Bihar	25	15	86	58	+ 17	52	− 0	03
Bharatpur ...	Rajathan	27	13	77	29	− 20	04	+ 0	03
Bhatinda ...	Punjab	30	12	74	56	− 30	16	+ 0	05
Bhatpara ...	W.B.	22	56	88	26	+ 23	44	− 0	04
Bhavnagar ...	Gujarat	21	46	72	11	− 41	16	+ 0	07
Bhilainagar ...	M.P.	21	11	81	20	− 4	40	+ 0	01
Bhopal ...	M.P.	23	16	77	25	− 20	20	+ 0	03
Bhubaneswar ...	Orissa	20	15	85	50	+ 13	20	− 0	02
Bhuj ...	Gujarat	23	16	69	48	− 50	48	+ 0	08
Bhusawal ...	Maharastra	21	02	75	47	− 26	52	+ 0	04
Bijapur ...	Karnataka	16	51	75	44	− 27	04	+ 0	04
Bijnor ...	U. P.	29	23	78	11	− 17	16	+ 0	03
Bikaner ...	Rajasthan	28	01	73	19	− 36	44	+ 0	06
Bilasipara ...	Assam	26	13	90	13	+ 30	52	− 0	05
Bilaspur ...	M.P.	22	05	82	13	− 1	08	+ 0	00
Bilaspur ...	H.P.	31	20	76	45	− 23	00	+ 0	04
Bilimora ...	Gujarat	20	46	72	58	− 38	08	+ 0	06
Bishnupur ...	W.B.	23	05	87	18	+ 19	12	− 0	03
Bolpur ...	W.B.	23	40	87	42	+ 20	48	− 0	03
Bolangir ...	Orissa	20	40	83	30	+ 4	00	− 0	01
Bongaon ...	W.B.	23	04	88	49	+ 25	16	− 0	04
Brindaban ...	U.P.	27	33	77	44	− 19	04	+ 0	03
Broach ...	Gujarat	21	41	73	01	− 37	56	+ 0	06
Bulandshahr ...	U.P.	28	24	77	54	− 18	24	+ 0	03
Bulsar ...	Gujarat	20	36	72	59	− 38	04	+ 0	06
Burnpur ...	W.B.	23	39	86	56	+ 17	44	− 0	03
Buxar ...	Bihar	25	34	84	01	+ 6	04	− 0	01
Calcutta (Alipore Obs.) ...	W.B.	22	32	88 (5*h*53*m*20*s*)	20	+ 23	20	− 0	04

Latitude, Longitude and Local Time corrections of principal cities in India

PLACE		Latitude North		Longitude East		Local Time Correction L.M.T. from I.S.T		Corr. to *Indian* Sid. Time	
		°	'	°	'	m	s	m	s
Calcutta ...	W.B.	22	35	88	23	+ 23	30	− 0	04
(Presidency College Obs.)				(5*h*53*m*30*s*)					
Calicut (Kozhikode)	Kerala	11	15	75	49	− 26	44	+ 0	04
Cannanore ...	Kerala	11	52	75	25	− 28	20	+ 0	05
Cape Comorin ... (Kanniya Kumari)	Tamil N.	8	04	77	34	− 19	44	+ 0	03
Chaibasa ...	Bihar	22	33	85	51	+ 13	24	− 0	02
Chandausi ...	U.P.	28	27	78	49	− 14	44	+ 0	02
Chandannagar ...	W.B.	22	52	88	22	+ 23	28	− 0	04
Chandigarh ...	Punjab	30	44	76	53	− 22	28	+ 0	03
Chapra ...	Bihar	25	47	84	43	+ 8	52	− 0	01
Chennai ...	Tamil N.	13	04	80	15	− 9	00	+ 0	01
Chhindwara ...	M.P.	22	03	78	59	− 14	04	+ 0	02
Chidambaram ...	Tamil Nadu	11	24	79	44	− 11	04	+ 0	02
Chingleput ...	Tamil Nadu	12	42	80	01	− 9	56	+ 0	02
Chinsura ...	W.B.	22	54	88	21	+ 23	24	− 0	04
Chirala ...	Andhra P.	15	50	80	22	− 8	32	+ 0	01
Chittaranjan ...	W.B.	23	50	86	50	+ 17	20	− 0	03
Chittoor ...	Andhra P.	13	14	79	04	− 13	44	+ 0	02
Chunar ...	U.P.	25	08	82	56	+ 1	44	− 0	00
Churu ...	Rajasthan	28	18	74	58	− 30	08	+ 0	05
Cochin ...	Kerala	9	58	76	15	− 25	00	+ 0	04
Coimbatore ...	Tamil Nadu	11	00	76	56	− 22	16	+ 0	04
Contai ...	W.B.	21	50	87	48	+ 21	12	− 0	03
Cooch Bihar ...	W.B.	26	19	89	28	+ 27	52	− 0	05
Coonoor ...	Tamil Nadu	11	21	76	49	− 22	44	+ 0	04
Cuddalore ...	Tamil Nadu	11	43	79	49	− 10	44	+ 0	02
Cuddapah ...	Andhra P.	14	28	78	50	− 14	40	+ 0	02
Cuttack ...	Orissa	20	29	85	52	+ 13	28	− 0	02
Daltanganj ...	Bihar	24	02	84	04	+ 6	16	− 0	01
Daman ...	Gujarat	20	25	72	53	− 38	28	+ 0	06
Damoh ...	M. P.	23	50	79	29	− 12	04	+ 0	02
Danapur ...	Bihar	25	38	85	05	+ 10	20	− 0	03
Darbhanga ...	Bihar	26	10	85	54	+ 13	36	− 0	02
Darjeeling ...	W. B.	27	03	88	16	+ 23	04	− 0	04
Davangere ...	Karnataka	14	31	75	58	− 26	08	+ 0	04
Dehra Dun ...	U. P.	30	19	78	03	− 17	48	+ 0	03
Dehri ...	Bihar	24	53	84	14	+ 6	56	− 0	01
Delhi ...	Delhi	28	39	77	13	− 21	08	+ 0	03
Dewas ...	M. P.	22	58	76	06	− 25	36	+ 0	04
Dhanbad ...	Bihar	23	48	86	27	+ 15	48	− 0	03
Dhanuskodi ...	Tamil Nadu	9	12	79	23	− 12	28	+ 0	02
Dharampuri ...	Tamil Nadu	12	08	78	13	− 17	08	+ 0	03
Dharwar ...	Karnataka	15	28	75	01	− 29	56	+ 0	05
Dhenkanal ...	Orissa	20	40	85	38	+ 12	32	− 0	02
Dholpur ...	Rajasthan	26	42	77	56	− 18	16	+ 0	03
Dhubri ...	Assam	26	02	89	59	+ 29	56	− 0	05
Dhulia ...	Maharastra	20	58	74	47	− 30	52	+ 0	05
Diamond Harbour	W. B.	22	12	88	13	+ 22	52	− 0	04
Dibrugarh ...	Assam	27	29	94	55	+ 49	40	− 0	08
Digboi ...	Assam	27	33	95	40	+ 52	40	− 0	09
Digha ...	W. B.	21	40	87	40	+ 20	40	− 0	03
Diu ...	Gujarat	20	42	71	01	− 45	56	+ 0	08
Dimapur ...	Nagaland	25	51	93	48	+ 45	12	− 0	07
Dumka ...	Bihar	24	16	87	15	+ 19	00	− 0	03
Durg ...	M. P.	21	11	81	21	− 4	36	+ 0	01

Latitude, Longitude and Local Time corrections of principal cities in India

PLACE			Latitude North		Longitude East		Local Time Correction L.M.T. from I.S.T		Corr. to *Indian* Sid. Time	
			°	'	°	'	m	s	m	s
Durgapur	...	W. B.	23	30	87	20	+ 19	20	– 0	03
Dwarka	...	Gujarat	22	14	68	58	– 54	08	+ 0	09
Ellora	...	Maharastra	20	02	75	13	– 29	08	+ 0	05
Eluru	...	Andhra P.	16	43	81	09	– 5	24	+ 0	01
Ernakulam	...	Kerala	9	59	76	18	– 24	48	+ 0	04
Erode	...	Tamil Nadu	11	20	77	46	– 18	56	+ 0	03
Etawah	...	U. P.	26	47	79	02	– 13	52	+ 0	02
Faizabad	...	U. P.	26	48	82	08	– 1	28	+ 0	00
Farakka	...	W. B.	24	48	87	56	+ 21	44	– 0	04
Faridabad	...	Haryana	28	25	77	22	– 20	32	+ 0	03
Faridkot	...	Punjab	30	40	74	57	– 30	12	+ 0	05
Fatehgarh	...	U. P.	27	23	79	35	– 11	40	+ 0	02
Fatehpur	...	U. P.	25	55	80	47	– 6	52	+ 0	01
Ferozabad	...	U. P.	27	09	78	24	– 16	24	+ 0	03
Ferozepur	...	Punjab	30	55	74	40	– 31	20	+ 0	05
Gandhinagar	...	Gujarat	23	15	72	45	– 39	00	+ 0	06
Gangtok	...	Sikkim	27	20	88	36	+ 24	24	– 0	04
Gaya	...	Bihar	24	48	85	01	+ 10	04	– 0	02
Gaud	...	W. B.	24	54	88	07	+ 22	28	– 0	04
Ghatal	...	W.B.	22	40	87	44	+ 20	56	– 0	03
Ghatsilia	...	Bihar	22	35	86	28	+ 15	52	– 0	03
Ghaziabad	...	U.P.	28	40	77	28	– 20	08	+ 0	03
Ghazipur	...	U.P.	25	36	83	36	+ 4	24	– 0	01
Gilgit	...	Kashmir	35	55	74	20	– 32	40	+ 0	05
Gridih	...	Bihar	24	10	86	19	+ 15	16	– 0	03
Goalpara	...	Assam	26	10	90	36	+ 32	24	– 0	05
Gonda	...	U.P.	27	09	81	57	– 2	12	+ 0	09
Gopalpur	...	Orissa	19	16	84	57	+ 9	48	– 0	02
Gorakhpur	...	U.P.	26	45	83	22	+ 3	28	– 0	01
Gudivada	...	Andhra P.	16	25	81	00	– 6	00	+ 0	01
Gudur	...	Andhra P.	14	09	79	54	– 10	24	+ 0	02
Guntur	...	Andhra P.	16	19	80	26	– 8	16	+ 0	01
Gurdaspur	...	Punjab	32	03	75	27	– 28	12	+ 0	05
Gurgaon	...	Haryana	28	37	77	04	– 21	44	+ 0	04
Guwahati	...	Assam	26	10	91	45	+ 37	00	– 0	06
Gwalior	...	M.P.	26	14	78	10	– 17	20	+ 0	03
Habra	...	W.B.	22	50	88	38	+ 24	32	– 0	04
Haldia	...	W.B.	22	02	88	05	+ 22	20	– 0	04
Hanamkonda	...	Andhra P.	18	03	79	32	– 11	52	+ 0	02
Hapur	...	U.P.	28	43	77	55	– 18	20	+ 0	03
Hardoi	...	U.P.	27	20	80	10	– 9	20	+ 0	05
Haridwar	...	U.P.	29	56	78	08	– 17	28	+ 0	02
Hassan	...	Karnataka	13	00	76	05	– 25	40	+ 0	04
Hathras	...	U.P.	27	36	78	06	– 17	36	+ 0	03
Hazaribagh	...	Bihar	23	59	85	22	+ 11	28	– 0	02
Hindupur	...	Andhra P.	13	49	77	32	+ 19	52	+ 0	03
Hirakud	...	Orissa	21	30	84	00	+ 6	00	– 0	01
Hissar	...	Haryana	29	10	75	44	– 27	04	+ 0	04
Hoogly	...	W.B.	22	54	88	24	+ 23	36	– 0	04
Hoshiarpur	...	Punjab	31	32	75	57	– 26	12	+ 0	04
Hospet	...	Karnataka	15	16	76	26	– 24	24	+ 0	04
Howrah	...	W.B.	22	36	88	19	+ 23	16	– 0	04
Hubli	...	Karnataka	15	20	75	12	– 29	12	+ 0	05

Latitude, Longitude and Local Time corrections of principal cities in India

PLACE			Latitude North		Longitude East		Local Time Correction L.M.T. from I.S.T		Corr. to *Indian* Sid. Time	
			°	'	°	'	m	s	m	s
Hyderabad	...	Andhra P.	17	26	78	27	− 16	12	+ 0	03
Imphal	...	Manipur	24	48	93	57	+ 45	48	− 0	07
Indore	...	M.P.	22	43	75	51	− 26	36	+ 0	04
Itanagar	...	Arunachal P.	27	08	93	40	+ 44	40	− 0	07
Itarsi	...	M.P.	22	36	77	45	− 18	48	+ 0	03
Jabalpur	...	M.P.	23	09	79	57	− 10	12	+ 0	02
Jagdalpur	...	M.P.	19	05	82	04	− 1	44	+ 0	00
Jaipur	...	Rajasthan	26	55	75	49	− 26	44	+ 0	04
Jaisalmir	...	Rajasthan	26	55	70	57	− 46	12	+ 0	06
Jalandhar	...	Punjab	31	20	75	34	− 27	44	+ 0	05
Jalgaon	...	Maharastra	21	03	75	40	− 27	20	+ 0	04
Jalpaiguri	...	W.B.	26	32	88	44	+ 24	56	− 0	04
Jamalpur	...	Bihar	25	19	86	32	+ 16	08	− 0	03
Jammu	...	Kashmir	32	43	74	52	− 30	32	+ 0	05
Jamnagar	...	Gujarat	22	27	70	07	− 49	32	+ 0	08
Jamshedpur	...	Bihar	22	48	86	11	+ 14	44	− 0	02
Jangipur	...	W. B.	24	28	88	05	+ 22	20	− 0	00
Jaunpur	...	U. P.	25	46	82	42	+ 0	48	− 0	00
Jhansi	...	M. P.	25	27	78	33	− 15	48	+ 0	03
Jharia	...	Bihar	23	50	86	33	+ 16	12	− 0	03
Jodhpur	...	Rajasthan	26	18	73	02	− 37	52	+ 0	06
Jorhat	...	Assam	26	46	94	13	+ 46	52	− 0	08
Junagadh	...	Gujarat	21	33	70	27	− 48	12	+ 0	08
Kailasahar	...	Tripura	24	22	92	00	+ 38	00	− 0	06
Kakinada	...	Andhra P.	16	57	82	13	− 1	08	+ 0	00
Kalahasti	...	Andhra P.	13	45	79	44	− 11	04	+ 0	02
Kalimpong	...	W. B.	26	05	88	26	+ 23	44	− 0	04
Kalyan	...	Maharastra	19	14	73	10	− 37	20	+ 0	06
Kalyani	...	W. B.	23	00	88	28	+ 23	52	− 0	04
Kanauj	...	U. P.	27	02	79	55	− 10	20	+ 0	02
Kanchipuram	...	Tamil Nadu	12	50	79	42	− 11	12	+ 0	02
Kandla	...	Gujarat	21	21	71	17	− 44	52	+ 0	07
Kanpur	...	U. P.	26	29	80	21	− 8	36	+ 0	01
Karad	...	Maharastra	17	15	74	12	− 33	12	+ 0	05
Karikal	...	Pondicherry	10	56	79	51	− 10	36	+ 0	02
Karimganj	...	Assam	24	50	92	30	+ 40	00	− 0	07
Karwar	...	Karnataka	14	48	74	11	− 33	16	+ 0	05
Katihar	...	Bihar	25	34	87	34	+ 20	16	− 0	03
Katni	...	M. P.	23	47	80	27	− 8	12	+ 0	01
Katras	...	Bihar	23	49	86	17	+ 15	08	− 0	02
Kavalur Obs.	...	Tamil Nadu	12	35	78	46	− 14	56	+ 0	02
Khammam	...	Andhra P.	17	14	80	06	− 9	36	+ 0	02
Khandwa	...	M. P.	21	50	76	20	− 24	40	+ 0	04
Kharagpur	...	W. B.	22	20	87	20	+ 19	20	− 0	03
Khurda	...	Orissa	20	11	85	38	+ 12	32	− 0	02
Kirkee	...	Maharastra	18	33	73	54	− 34	24	+ 0	06
Kishanganj	...	Bihar	26	10	87	02	+ 18	08	− 0	03
Kodaikanal	...	Tamil Nadu	10	14	77	28	− 20	08	+ 0	03
Kohima	...	Nagaland	25	41	94	07	+ 46	28	− 0	08
Kolar	...	Karnataka	13	09	78	11	− 17	16	+ 0	03
Kolhapur	...	Maharastra	16	42	74	14	− 33	04	+ 0	05
Kollegal	...	Karnataka	12	09	77	09	− 21	24	+ 0	04
Koraput	...	Orissa	18	50	82	40	+ 0	40	− 0	00

Latitude, Longitude and Local Time corrections of principal cities in India

PLACE		Latitude North		Longitude East		Local Time Correction L.M.T. from I.S.T		Corr. to *Indian* Sid. Time	
		°	'	°	'	m	s	m	s
Kota ...	Rajasthan	25	10	75	52	– 26	32	+ 0	04
Kottayam ...	Kerala	9	36	76	32	– 23	52	+ 0	04
Krishnagar ...	W. B.	23	23	88	30	+ 24	00	– 0	04
Kumbakonam ...	Tamil Nadu	10	58	79	25	– 12	20	+ 0	02
Kurnool ...	Andhra P.	15	50	78	03	+ 17	48	– 0	03
Lucknow ...	U. P.	26	51	80	56	– 6	16	+ 0	01
Ludhiana ...	Punjab	30	55	75	52	– 26	32	+ 0	04
Lumding ...	Assam	25	46	93	10	+ 42	40	– 0	07
Machilpatnam ...	Andhra P.	16	11	81	07	– 5	32	+ 0	01
Madhupur ...	Bihar	24	18	86	37	+ 16	28	– 0	03
Madurai ...	Tamil Nadu	9	58	78	10	– 17	20	+ 0	03
Mahabalipuram ...	Tamil Nadu	12	37	80	14	– 9	04	+ 0	01
Mahbubnagar ...	Andhra P.	16	42	77	58	– 18	08	+ 0	03
Mahe ...	Kerala	11	43	75	33	– 27	48	+ 0	05
Maihar ...	M. P.	24	16	80	49	– 6	44	+ 0	01
Mainpuri ...	U. P.	27	14	79	03	– 13	48	+ 0	02
Maithan ...	Bihar	23	54	86	54	+ 17	36	– 0	03
Malda ...	W. B.	25	05	88	09	+ 22	36	– 0	04
Mangalore ...	Karnataka	12	52	74	50	– 30	40	+ 0	05
Marwar ...	Rajasthan	25	43	73	45	– 35	00	+ 0	06
Mathura ...	U. P.	27	28	77	.42	– 19	12	+ 0	02
Medak ...	Maharastra	18	02	78	16	– 16	56	+ 0	03
Meerut ...	U. P.	29	01	77	45	– 19	00	+ 0	03
Mercara ...	Karnataka	12	26	75	47	– 26	52	+ 0	04
Mettur ...	Tamil Nadu	11	47	77	48	– 18	48	+ 0	03
Mhow ...	M. P.	22	34	75	47	– 26	52	+ 0	04
Midnapore ...	W. P.	22	26	87	19	+ 19	16	– 0	03
Miraj ...	Maharastra	16	49	74	43	– 31	08	+ 0	05
Mirpur ...	Kashmir	33	12	73	49	– 34	44	+ 0	06
Mirzapur ...	U. P.	25	09	82	33	+ 0	12	– 0	00
Moradabad ...	U. P.	28	51	78	47	– 14	52	+ 0	02
Morvi ...	Gujarat	22	49	70	49	– 46	44	+ 0	08
Motihari ...	Bihar	26	38	84	54	+ 9	36	– 0	02
Mughal Sarai ...	U. P.	25	17	83	08	+ 2	32	– 0	00
Mumbai ...	Maharastra	18	58	72	50	– 38	40	+ 0	06
Munger ...	Bihar	25	22	86	27	+ 15	48	– 0	03
Murshidabad ...	W. B.	24	12	88	18	+ 23	12	– 0	04
Mussoorie ...	U. P.	30	27	78	06	– 17	36	+ 0	03
Muzaffarnagar ...	U. P.	29	28	77	44	– 19	04	+ 0	03
Muzaffarpur ...	Bihar	26	07	85	22	+ 11	28	– 0	02
Mysore ...	Karnataka	12	18	76	39	– 23	24	+ 0	04
Nabadwip ...	W. B.	23	24	88	24	+ 23	36	– 0	04
Nabha ...	Punjab	30	25	76	09	– 25	24	+ 0	04
Nowgong ...	Assam	26	21	92	42	+ 40	48	– 0	07
Nagercoil ...	Tamil Nadu	8	11	77	29	– 20	04	+ 0	03
Nagpur ...	Maharastra	21	09	79	05	– 13	40	+ 0	02
Nahan ...	H. P.	30	33	77	21	– 20	36	+ 0	03
Naihati ...	W. B.	22	57	88	28	+ 23	52	– 0	04
Nainital ...	U. P.	29	22	79	27	– 12	12	+ 0	02
Nalanda ...	Bihar	25	09	85	25	+ 11	40	– 0	02
Nanded ...	Maharastra	19	09	77	27	– 20	12	+ 0	03
Nangal ...	Punjab	31	23	76	23	– 24	28	+ 0	04
Nasik ...	Maharastra	20	02	78	50	– 34	40	+ 0	06
Nawabganj ...	U. P.	26	56	82	12	– 1	12	+ 0	00

Latitude, Longitude and Local Time corrections of principal cities in India

PLACE		Latitude North °	'	Longitude East °	'	Local Time Correction L.M.T. from I.S.T m	s	Corr. to *Indian* Sid. Time m	s
Neemuch ...	M.P.	24	27	74	52	– 30	32	+ 0	05
Nellore ...	Andhra P.	14	27	80	00	– 10	00	+ 0	02
Nizamabad ...	Andhra P.	18	40	78	06	– 17	36	+ 0	03
Ongole ...	Andhra P.	15	30	80	06	– 9	36	+ 0	02
Ootacamund ...	Tamil Nadu	11	24	76	44	– 23	04	+ 0	04
Osmanabad ...	Maharastra	18	12	76	03	– 25	48	+ 0	04
Palghat ...	Kerala	10	46	76	40	– 23	20	+ 0	04
Panaji ...	Goa	15	29	73	49	– 34	44	+ 0	06
Panipat ...	Haryana	29	23	77	01	– 21	56	+ 0	04
Pasighat ...	Arunachal P.	28	05	95	20	+ 51	20	– 0	09
Pathankot ...	Punjab	32	17	75	40	– 27	20	+ 0	04
Patiala ...	Punjab	30	19	76	24	– 24	24	+ 0	04
Patna ...	Bihar	25	36	85	08	+ 10	32	– 0	02
Pilibhit ...	U.P.	28	38	79	51	– 10	36	+ 0	02
Pollachi ...	Tamil Nadu	10	39	77	03	– 21	48	+ 0	04
Pondicherry ...	Pondichery	11	56	79	50	– 10	40	+ 0	02
Porbander ...	Gujarat	21	38	69	37	– 51	32	+ 0	08
Port Blair ...	Andaman	11	40	92	46	+ 41	04	– 0	07
Pudukkottai ...	Tamil Nadu	10	23	78	52	– 14	32	+ 0	02
Pune ...	Maharastra	18	31	73	53	– 34	28	+ 0	06
Puri ...	Orissa	19	48	85	50	+ 13	20	– 0	02
Purnea ...	Bihar	25	47	87	31	+ 20	04	– 0	03
Purulia ...	W. B.	23	20	86	23	+ 15	32	– 0	03
Quilon ...	Kerala	8	54	76	38	– 23	28	+ 0	04
Rae Bareli ...	U. P.	26	14	81	13	– 5	08	+ 0	01
Raichur ...	Karnataka	16	12	77	21	– 20	36	+ 0	03
Raiganj ...	W. B.	25	36	88	08	+ 22	32	– 0	04
Raigarh ...	M. P.	21	54	83	26	+ 3	44	– 0	01
Raipur ...	M. P.	21	15	81	37	– 3	32	+ 0	01
Rajahmundry ...	Andhra P.	17	00	81	46	– 2	56	+ 0	00
Rajgir ...	Bihar	25	02	85	25	+ 11	40	– 0	02
Rajkot ...	Gujarat	22	18	70	48	– 46	48	+ 0	08
Rajmahal ...	Bihar	25	03	87	53	+ 21	32	– 0	04
Rameswaram ...	Tamil Nadu	9	18	79	18	– 12	48	+ 0	02
Ramanathapuram	Tamil Nadu	9	22	78	51	– 14	36	+ 0	02
Rampur ...	H. P.	31	26	77	38	– 19	28	+ 0	03
Rampur ...	U. P.	28	46	79	02	– 13	52	+ 0	02
Ranaghat ...	W. B.	23	11	88	37	+ 24	28	– 0	04
Ranchi ...	Bihar	23	22	85	21	+ 11	24	– 0	02
Rangiya ...	Assam	26	30	91	35	+ 36	20	– 0	06
Raniganj ...	W. B.	23	35	87	07	+ 18	28	– 0	03
Ranikhet ...	U. P.	29	38	79	28	– 12	08	+ 0	02
Ratangarh ...	Rajasthan	28	05	74	39	– 31	24	+ 0	05
Ratlam ...	M.P.	23	31	75	07	– 29	32	+ 0	05
Ratnagiri ...	Maharastra	17	08	73	19	– 36	44	+ 0	06
Raxaul ...	Bihar	26	58	84	51	+ 9	24	– 0	02
Rewa ...	M.P.	24	33	81	17	– 4	52	+ 0	01
Rohtak ...	Haryana	28	54	76	34	– 23	44	+ 0	04
Roorkee ...	U.P.	29	52	77	53	– 18	28	+ 0	03
Rourkela ...	Orissa	22	25	84	52	+ 9	28	– 0	02
Sadiya ...	Arunachal P.	27	48	94	38	+ 48	32	– 0	08

Latitude, Longitude and Local Time corrections of principal cities in India

PLACE		Latitude North		Longitude East		Local Time Correction L.M.T. from I.S.T		Corr. to *Indian* Sid. Time	
		°	'	°	'	m	s	m	s
Sagar ...	M.P.	23	50	78	50	− 14	40	+ 0	02
Sagar ...	Karnataka	16	37	76	51	− 22	36	+ 0	04
Saharanpur ...	U.P.	29	58	77	32	− 19	52	+ 0	03
Salem ...	Tamil Nadu	11	40	78	10	− 17	20	+ 0	03
Samastipur ...	Bihar	25	55	85	50	+ 13	20	− 0	02
Sambalpur ...	Orissa	21	27	83	58	+ 5	52	− 0	01
Sangli ...	Maharastra	16	52	74	36	− 31	36	+ 0	05
Santiniketan(Bolpur)	W.B.	23	39	87	43	+ 20	52	− 0	03
Santipur ...	W.B.	23	15	88	29	+ 23	56	− 0	04
Sasaram ...	Bihar	24	57	84	03	+ 6	12	− 0	01
Satara ...	Maharastra	17	42	74	00	− 34	00	+ 0	06
Satna ...	M.P.	24	34	80	55	− 6	20	+ 0	01
Secunderabad ...	Andhra P.	17	27	78	33	− 15	48	+ 0	03
Seoni ...	M.P.	22	06	79	35	− 11	40	+ 0	02
Serampur ...	W.B.	22	45	88	23	+ 23	32	− 0	04
Shahabad ...	U.P.	27	30	80	05	− 9	40	+ 0	02
Shahdol ...	M.P.	23	00	81	30	− 4	00	+ 0	03
Shamli ...	U.P.	29	27	77	19	− 20	44	+ 0	03
Shikohabad ...	U.P.	27	07	78	35	− 15	40	+ 0	03
Shillong ...	Meghalaya	25	35	91	53	+ 37	32	− 0	06
Shimoga ...	Karnataka	13	56	75	38	− 27	28	+ 0	05
Shivpuri ...	M.P.	25	40	77	44	− 19	04	+ 0	03
Sholapur ...	Maharastra	17	39	75	55	− 26	20	+ 0	04
Sibsagar ...	Assam	27	00	94	37	+ 48	28	− 0	08
Silchar ...	Assam	24	50	92	47	+ 41	08	− 0	07
Siliguri ...	W.B.	26	44	88	26	+ 23	44	− 0	04
Simla ...	H.P.	31	06	77	10	− 21	20	+ 0	03
Sindri ...	Bihar	23	39	86	31	+ 16	04	− 0	03
Sitamari ...	Bihar	26	35	85	32	+ 12	08	− 0	02
Srikakulam ...	Andhra P.	18	18	83	56	+ 5	44	− 0	01
Srinagar ...	Kashmir	34	06	74	48	− 30	48	+ 0	05
Srirangam ...	Tamil Nadu	10	52	78	44	− 15	04	+ 0	02
Sultanpur ...	U.P.	26	16	82	07	− 1	32	+ 0	00
Sundargarh ...	Orissa	22	06	84	00	+ 6	00	− 0	01
Surat ...	Gujarat	21	10	72	51	− 38	36	+ 0	06
Surendranagar ...	Gujarat	22	43	71	33	− 43	48	+ 0	07
Suri ...	W.B.	23	54	87	34	+ 20	16	− 0	03
Tamluk ...	W.B.	22	18	87	54	+ 21	36	− 0	04
Tangla ...	Assam	26	40	91	54	+ 37	36	− 0	06
Tarakeswar ...	W.B.	22	54	88	02	+ 22	08	− 0	04
Tenali ...	Andhra P	16	14	80	38	− 7	28	+ 0	01
Tezpur ...	Assam	26	37	92	47	+ 41	08	− 0	07
Thanjavur ...	Tamil Nadu	10	47	79	08	− 13	28	+ 0	02
Tinsukia ...	Assam	27	28	95	20	+ 51	20	− 0	08
Tiruchirapalli ...	Tamil Nadu	10	50	78	42	− 15	12	+ 0	02
Tirunelveli ...	Tamil Nadu	8	44	77	41	− 19	16	+ 0	03
Tirupati ...	Andhra P.	13	40	79	20	− 12	40	+ 0	02
Trichur ...	Kerala	10	30	76	15	− 25	00	+ 0	04
Thiruvanathapuram	Kerala	8	31	77	00	− 22	00	+ 0	04
Tura ...	Meghalay	25	11	90	13	+ 30	52	− 0	05
Tuticorin ...	Tamil Nadu	8	49	78	09	− 17	24	+ 0	03
Udaipur ...	Rajasthan	24	35	73	44	− 35	04	+ 0	06
Udupi ...	Karnataka	13	20	74	45	− 31	00	+ 0	05
Ujjain ...	M.P.	23	11	75	46	− 26	56	+ 0	04

Latitude, Longitude and Local Time corrections of principal cities in India

PLACE			Latitude North		Longitude East		Local Time Correction L.M.T. from I.S.T			Corr. to *Indian* Sid. Time		
			°	'	°	'		m	s		m	s
Varanasi	...	U.P.	25	19	83	01	+	2	04	−	0	00
Vellore	...	Tamil Nadu	12	55	79	11	−	13	16	+	0	02
Veraval	...	Gujarat	20	53	70	26	−	48	16	+	0	08
Vidar	...	Karnataka	17	56	77	35	−	19	40	+	0	02
Vidisha	...	M.P.	23	32	77	51	−	18	36	+	0	03
Vijayawada	...	Andhra P.	16	32	80	36	−	7	36	+	0	01
Visakhapatnam	...	Andhra P.	17	43	83	19	+	3	16	−	0	01
Vizianagram	...	Andhra P.	18	07	83	26	+	3	44	−	0	01
Waltair	...	Andhra P.	17	47	83	12	+	2	48	−	0	00
Warangal	...	Andhra P.	17	58	79	40	−	11	20	+	0	02
Wardha	...	Maharastra	20	44	78	37	−	15	32	+	0	03
Yeotmal	...	Maharastra	20	25	78	08	−	17	28	+	0	03

Note :- The longitude of place also represents the difference of local time from G. M. T. converted at the rate of 4 mins. per degree and 4 secs. per minute of longitude (*i.e.* 1 hour for 15 degrees). By this method the longitude of a place in arc may be converted into time. The time of a place in the east is in advance of (*viz.* more than) that in the west.

The Standard Time of India (I. S. T) is 5*h* 30*m* ahead of G.M.T.

In India to obtain I. S. T. from the longitude of the place *add* 4 × (82°30' (–) Long, of the place) or *deduct* 4× (Long. of the place – 82°30') as the station is west or east of 82° 30' E. Longitude.

The Standard meridian of India is situated at 82°30' E Long. and 23°11' N. Lats.

Correction to get *Indian Sidereal Time* is obtained at the rate of 0.66 seconds per degree of longitude from the *Central Meridian* of India (*viz,* 82°E30') and positive for west and negative for east *e.g.,* for Delhi, longitude is 77°E13'. Diff. from Central meridian of India (*Viz.* 82°E30') is 5°17'. Multiplying 5°17' by 0.66 sec., the result is +3*s*.

To obtain the Standard time at any station, *add* four minutes for each degree when the station is west of the standard meridian, or deduct four minutes for each degree when the station is east of the standard meridian.

Cities of Bangladesh and Pakistan

The corrections to get the local time (L.M.T.) for cities in Bangladesh and Pakistan are given with reference to the Zonal Standerd Time (6*h* ahead of G.M.T. for Bangladesh and 5*h* for Pakistan) and also with reference to the Indian Standard Time ($5^1/_2$ *h* ahead of G.M.T.)

Bangladesh (formerly East Pakistan) observed Bengal Time ($6^1/_2{}^h$ ahead of G.M.T.) for civil purposes and Pakistan Standard time same as I.S.T., for Railway and Postal work etc. up to 30-9-51. From 1st October 1951 East Pakistan (now Bangladesh) Standard time is 30 minutes more than I.S.T. and West Pakistan (now Pakistan) Standard Time is 30 minutes less than I.S.T.

Local time of some cities of neighbouring countries

Bangladesh Std. Time (–)30m = I.S.T.	Latitude North	Longitude East	Local Time Correction: L.M.T. from Zonal Std. Time	Local Time Correction: L.M.T from I. S. T.	Corr. to *Indian* Sid. Time
(Time Zone : +6h)	° '	° '	m s	m s	m s
Barisal	22 42	90 22	+ 1 28	+ 31 28	– 0 05
Bogra	24 51	89 23	– 2 28	+ 27 32	– 0 05
Chandpur	23 14	90 38	+ 2 32	+ 32 32	– 0 05
Chittagong	22 20	91 50	+ 7 20	+ 37 20	– 0 06
Comilla	23 28	91 12	+ 4 48	+ 34 48	– 0 06
Cox Bazar	21 27	92 00	+ 8 00	+ 38 00	– 0 06
Dhaka	23 43	90 25	+ 1 40	+ 31 40	– 0 06
Dinajpur	25 40	88 58	– 5 28	+ 24 32	– 0 04
Faridpur	23 36	89 51	– 0 36	+ 29 24	– 0 05
Gaibanda	25 22	89 33	– 1 48	+ 28 12	– 0 05
Gualnado	23 49	89 45	– 1 00	+ 29 00	– 0 05
Jessore	24 08	89 05	– 3 40	+ 26 20	– 0 04
Ishwordi	23 08	89 12	– 3 12	+ 26 48	– 0 04
Khulna	22 48	89 35	– 1 40	+ 28 20	– 0 05
Kushtia	23 55	89 07	– 3 32	+ 26 28	– 0 04
Mymensing	24 45	90 24	+ 1 36	+ 31 36	– 0 05
Narayanganj	23 38	90 30	+ 2 00	+ 32 00	– 0 05
Nator	24 25	89 02	– 3 52	+ 26 08	– 0 04
Netrakona	24 53	90 45	+ 3 00	+ 33 00	– 0 05
Noakhali	22 48	91 06	+ 4 24	+ 34 24	– 0 06
Pabna	24 01	89 16	– 2 56	+ 27 04	– 0 04
Parbatipur	25 40	88 53	– 4 28	+ 25 32	– 0 04
Rajshahi	24 22	88 36	– 5 36	+ 24 24	– 0 04
Rangpur	25 45	89 15	– 3 00	+ 27 00	– 0 04
Santahar	24 48	89 00	– 4 00	+ 26 00	– 0 04
Sirajganj	24 27	89 44	– 1 04	+ 28 56	– 0 05
Sylhet	24 55	91 52	+ 7 28	+ 37 28	– 0 06
Tangail	24 13	89 53	– 0 20	+ 29 40	– 0 05
Pakistan Standard Time (+) 30 *m* = I.S.T.					
(Time Zone : +5h)	° '	° '	m s	m s	m s
Bahawalpur	29 24	71 40	– 13 20	– 43 20	+ 0 07
Bannu	33 00	70 36	– 17 36	– 47 36	+ 0 08
Hyderabad	25 23	68 21	– 26 36	– 56 36	+ 0 09
Islamabad	33 42	73 10	– 7 20	– 37 20	+ 0 06
Karachi	24 52	67 03	– 31 48	– 61 48	+ 0 10
Lahore	31 35	74 18	– 2 48	– 32 48	+ 0 05
Multan	30 12	71 28	– 14 08	– 44 08	+ 0 07
Peshawar	34 01	71 34	– 13 44	– 43 44	+ 0 07
Quetta	30 12	67 02	– 31 56	– 61 56	+ 0 10
Rawalpindi	33 35	73 03	– 7 48	– 37 48	+ 0 06
Sukkur	27 43	68 53	– 24 28	– 54 28	+ 0 09

Sri Lanka, Nepal & Bhutan

Place	Time Zone	Latitude North	Longitude East	Local Time Correction: L.M.T from Zonal Std.Time	Local Time Correction: L.M.T from I. S. T.	I.S.T. from Z.S.T	Corr. to Indian Sid. Time
	h m	° '	° '	m s	m s	h m	m s
Anuradhapur (Sri Lanka)	+5 30	8 21	80 23	– 8 28	– 8 28	0 0	+ 0 02
Colombo (Sri Lanka)	+5 30	6 56	79 52	– 10 32	– 10 32	0 0	+ 0 02
Galle (Sri Lanka)	+5 30	6 02	80 13	– 9 08	– 9 08	0 0	+ 0 02
Jaffna (Sri Lanka)	+5 30	9 40	80 00	– 10 00	– 10 00	0 0	+ 0 02
Kandy (Sri Lanka)	+5 30	7 18	80 38	– 7 28	– 7 28	0 0	+ 0 01
Trincomalee (Sri Lanka)	+5 30	8 34	81 14	– 5 04	– 5 04	0 0	+ 0 01
Biratnagar (Nepal)	+5 45	26 29	87 17	+ 4 8	+ 19 08	– 0 15	– 0 03
Kathmandu (Nepal)	+5 45	27 42	85 19	– 3 44	+ 11 16	– 0 15	– 0 02
Punakha (Bhutan)	+6 00	27 36	89 50	– 0 40	+ 29 20	– 0 30	– 0 05
Thimpu (Bhutan)	+6 00	27 32	89 53	– 0 28	+ 29 32	– 0 30	– 0 05

+ is Time ahead of G. M. T. or U. T

Example : Place : Sylhet (Bangladesh) (Long. 91°E52'). Time Zone = +6*h*

L . M. T. from Zonal S. T. D. Time = 91°52' × 4= 367 *m* 28*s*=6*h* 7*m* 28*s* (–) 6h (Time Zone)= + 7*m* 28s

L. M. T. from I.S. T= 6*h* 7*m* 28*s*(–) 5*h* 30*m* 0*s* = + 37*m* 28*s*

LOCAL TIME OF SOME FOREIGN CITIES

The adopted Zonal Standard Times of the territories with reference to which the local time corrections for the cities and the reductions to I.S.T have been given are those as in current use. It is likely that before and during the war period some of these standard times were different, but it has not been possible to indicate here all such changes.

In many countries summer time is kept, *i.e.* during the summer months the clocks are advanced usually by one hour. If the recorded time of the event is summer time, it should be converted into the normal standard time of the territory or zone by making necessary correction (generally *minus* 1 hr.) before the reductions for local time and I.S.T. are applied.

(Countries observing Summer Time or Day Light Saving Time during the summer months are marked with asterisks).

PLACE		Time Zone	Latitude		Longitude		L. M. T. from Zonal Standard Time		I. S. T. from Z. S. T.		Corr. to *Indian* Sid. Time	
		h	°	′	°	′	m	s	h	m	m	s
Abu Dhabi	U. A. E.	+ 4	24	28N	54	22E	– 22	32	+ 1	30	+ 0	18
Accra	Ethiopia	+ 0	5	31N	0	15W	– 1	00	+ 5	30	+ 0	54
Addis Ababa	Ethiopia	+ 3	9	02N	38	44E	– 25	04	+ 2	30	+ 0	29
Aden	Yemen	+ 3	12	45N	45	04E	+ 0	16	+ 2	30	+ 0	25
Akyab	Myanmar	+ $6\frac{1}{2}$	20	09N	92	55E	– 18	20	– 1	00	– 0	07
Alexandria	Egypt*	+ 2	31	12N	29	53E	– 0	28	+ 3	30	+ 0	35
Amsterdam	Netherland	+ 1	52	22N	4	53E	– 40	28	+ 4	30	+ 0	51
Angmagssalik	Greenland	– 3	65	36N	37	41W	+ 29	16	+ 8	30	+ 1	19
Ankara	Turkey*	+ 2	39	57N	32	54E	+ 11	36	+ 3	30	+ 0	33
Athens	Greece	+ 2	37	54N	23	52E	– 24	32	+ 3	30	+ 0	38
Auckland	New Zealand	+ 12	36	52S	174	42E	– 21	12	– 6	30	– 1	01
Baghdad	Iraq	+ 3	33	20N	44	27E	– 2	12	+ 2	30	+ 0	25
Bangkok	Thailand	+ 7	13	44N	100	30E	– 18	00	– 1	30	– 0	12
Beijing	China	+ 8	39	55N	116	25E	– 14	20	– 2	30	– 0	18
Beirut	Lebanon*	+ 2	33	50N	35	25E	+ 21	40	+ 3	30	+ 0	31
Belgrade	Yugoslavia	+ 1	44	50N	20	30E	+ 22	00	+ 4	30	+ 0	41
Berlin	Germany	+ 1	52	32N	13	25E	– 6	20	+ 4	30	+ 0	45
Berne	Switzerland	+ 1	46	57N	7	26E	– 30	16	+ 4	30	+ 0	49
Birmingham	England*	0	52	30N	1	50W	– 7	20	+ 5	30	+ 0	55
Bonn	Germany	+ 1	50	44N	7	04E	– 31	44	+ 4	30	+ 0	50
Boston	U. S. A*	– 5	42	21N	71	04W	+ 15	44	+ 10	30	+ 1	41
Brasilia	Brazil	– 3	16	13S	44	29W	+ 2	04	+ 8	30	+ 1	23
Brisbane	Australia	+ 10	27	28S	153	02E	+ 12	08	– 4	30	– 0	47
Brussels	Belgium	+ 1	50	52N	4	22E	+ 42	32	+ 4	30	+ 0	51
Bucharest	Romania	+ 2	44	25N	26	07E	– 15	32	+ 3	30	+ 0	37
Budapest	Hungary	+ 1	47	29N	19	03E	+ 16	12	+ 4	30	+ 0	42
Buenos Aires	Argentina	– 3	34	35S	58	20W	– 53	20	+ 8	30	+ 1	32
Cairo	Egypt*	+ 2	30	08N	31	34E	+ 6	16	+ 3	30	+ 0	34
California	U.S.A	– 8	35	07N	117	59W	+ 8	04	+ 13	30	+ 2	12
Canberra	Australia	+ 10	35	19S	149	00E	– 4	00	– 4	30	– 0	44
Cape Town	South Africa	+ 2	33	56S	18	29E	– 46	04	+ 3	30	+ 0	42
Chicago	U.S.A*	– 6	41	53N	87	38W	+ 9	28	+ 11	30	+ 1	52
Copenhagen	Denmark	+ 1	55	40N	12	30E	– 10	00	+ 4	30	+ 0	46
Damascus	Syria*	+ 2	33	30N	36	14E	+ 24	56	+ 3	30	+ 0	30
Dar-es-Salam	Tanzania	+ 3	6	50S	39	17E	– 22	52	+ 2	30	+ 0	28
Detroit	U.S.A.	– 5	42	20N	83	02W	+ 27	52	+ 11	30	+ 1	49

Time Zone + Corr. for I. S.T. from Z.S.T = $5^h\ 30^m$

Local time of some Foreign Cities

PLACE		Time Zone	Latitude		Longitude		L. M. T. from Zonal Standard Time		I. S. T. form Z. S. T.		Corr. to *Indian* Sid. Time	
		h	°	'	°	'	*m*	*s*	*h*	*m*	*m*	*s*
Dublin	Ireland	+ 1	53	20N	6	15W	− 85	00	+ 4	30	+ 0	58
Dubai	U. A. E.	+ 4	25	18N	55	18E	− 18	48	+ 1	30	+ 0	18
Edinburgh	Scotland	0	55	56N	3	11W	− 12	44	+ 5	30	+ 0	56
Frankfurt	Germany	+ 1	50	06N	8	40E	− 25	20	+ 4	30	+ 0	48
Geneva	Switzerland	+ 1	46	12N	6	09E	− 35	24	− 4	30	+ 0	50
Glasgow	Scotland	0	55	52N	4	15W	− 17	00	+ 5	30	+ 0	57
Greenwich	England	0	51	29N	0	00	0	00	+ 5	30	+ 0	54
Hanoi	North Vietnam	+ 7	21	02N	105	52E	+ 3	28	− 1	30	− 0	15
Havana	Cuba*	− 5	23	08N	82	22W	− 29	28	+ 10	30	+ 1	48
Heidelberg	Germany	+ 1	49	24N	8	43E	− 25	08	+ 4	30	+ 0	49
Helsinki	Finland	+ 2	60	09N	24	57E	− 20	12	+ 3	30	+ 0	38
Hongkong	China*	+ 8	22	18N	114	10E	− 23	20	− 2	30	− 0	21
Honolulu	Hawai Island	− 10	22	00N	156	00W	− 24	00	+ 15	30	+ 2	37
Istanbul	Turkey*	+ 2	41	00N	29	00E	− 4	00	+ 3	30	+ 0	35
Jakarta	Indonesia	+ 7	6	16S	106	53E	+ 7	32	− 1	30	− 0	16
Johanesberg	South Africa	+ 2	26	15S	28	00E	− 8	00	+ 3	30	+ 0	36
Jerusalem	Israel	+ 2	31	46N	35	14E	+ 20	56	+ 3	30	+ 0	31
Jamaica	West Indies	− 5	18	00N	76	48W	− 7	12	+ 10	30	+ 1	45
Khartoum	Sudan*	+ 2	15	35N	32	35E	+ 10	20	+ 3	30	+ 0	33
Kabul	Afghanistan	+ 4½	34	33N	69	12E	+ 6	48	+ 1	00	+ 0	09
Kandahar	Afghanistan	+ 4½	31	32N	65	30E	− 8	00	+ 1	00	+ 0	11
Kuala Lumpur	Malaysia	+ 8	3	09N	101	43E	− 43	08	− 2	30	− 0	13
Kuwait	Kuwait	+ 3	29	30N	47	45E	+ 11	00	+ 2	30	+ 0	23
Kwangchow	China	+ 8	23	06N	113	16E	− 26	56	− 2	30	− 0	20
Lagos	Nigeria	+ 1	6	25N	3	27E	− 46	12	+ 4	30	+ 0	52
Leipzig	Germany	+ 1	51	20N	12	23E	− 10	28	+ 4	30	+ 0	46
Leeds	England*	0	53	50N	1	35W	+ 6	20	+ 5	30	+ 0	55
Leningrad	U.S.S.R.	+ 3	59	57N	30	18E	− 58	48	+ 2	30	+ 0	34
Lhasa	Tibet	+ 6	29	40N	91	07E	+ 4	28	− 0	30	− 0	06
Lima	Peru	− 5	12	02S	77	02W	− 8	08	+ 10	30	+ 1	45
Lisbon	Portugal	+ 1	38	43N	9	11W	− 96	44	+ 4	30	+ 1	00
Liverpool	England*	0	53	25N	2	55W	− 11	40	+ 5	30	+ 0	56
London	England*	0	51	32N	0	05W	− 0	20	+ 5	30	+ 0	54
Los Angeles	U.S.A.*	− 8	34	03N	118	17W	+ 6	52	+ 13	30	+ 2	12
Madrid	Spain	+ 1	40	25N	3	[illegible]W	− 74	44	+ 4	30	+ 0	[illegible]
Manchester	England*	0	53	30N	2	15W	− 9	[illegible]	+ 5	30	+ 0	56
Mandlay	Myanmar	+ 6½	22	00N	96	05E	− 5	40	[illegible]	00	[illegible]	[illegible]
Manila	[illegible]	+ 8	[illegible]	30N	124	[illegible]	[illegible]	[illegible]	[illegible]	30	[illegible]	[illegible]
Mecca	[illegible]	+ 3	21	25N	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	30	[illegible]	[illegible]
Melbourne	[illegible]	+ 10	37	50S	144	[illegible]	[illegible]	[illegible]	[illegible]	30	[illegible]	[illegible]
Mexico City	Mexico	− 6	[illegible]	26N	99	[illegible]W	[illegible]	[illegible]	[illegible]	30	[illegible]	[illegible]
Milan	Italy*	+ 1	45	28N	9	[illegible]E	− [illegible]	[illegible]	+ 4	30	[illegible]	[illegible]
Mombasa	Kenya	+ 3	4	00S	39	[illegible]E	− 21	[illegible]	+ 2	30	[illegible]	[illegible]
Montreal	Canada*	− 5	45	30N	73	[illegible]	+ 6	[illegible]	[illegible]	30	[illegible]	[illegible]
Moscow	U.S.S.R.	+ 3	55	45N	37	34E	− 29	44	+ 2	30	+ 0	[illegible]
Moulmein	Myanmar	+ 6½	16	30N	97	38E	+ 0	32	− 1	00	− 0	10
Munich	Germany	+ 1	48	08N	11	35E	− 13	40	+ 4	30	+ 0	46
Nairobi	Kenya	+ 3	1	18S	36	52E	− 32	32	+ 2	30	+ 0	[illegible]
New Castle	[illegible]*	0	52	27N	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
New Orleans	U.S.A.	− 6	29	57N	[illegible]	[illegible]	[illegible]	[illegible]	+ 11	30	[illegible]	[illegible]
New York	U.S.A.*	− 5	[illegible]	43N	[illegible]	[illegible]	[illegible]	[illegible]	+ 10	30	[illegible]	[illegible]

Time Zone + Corr. for I. S. T. from Z. S. T. = $5^h\ 30^m$

Local time of some Foreign Cities

PLACE		Time Zone	Latitude		Longitude		L. M. T. from Zonal Standard Time		I. S. T form Z. S. T.		Corr to *Indian* Sid. Time	
		h	°	'	°	'	*m*	*s*	*h*	*m*	*m*	*s*
Nuuk	Greenland	– 4	64	11N	51	44W	+ 33	04	+ 8	30	+ 1	29
Osaka	Japan	+ 9	34	40N	135	30E	+ 2	00	– 3	30	– 0	35
Oslo	Norway*	+ 1	59	54N	10	45E	– 17	00	+ 4	30	+ 0	47
Ottawa	Canada*	– 5	45	24N	75	43W	– 2	52	+ 10	30	+ 1	44
Paris	France	+ 1	48	50N	2	20E	– 50	40	+ 4	30	+ 0	53
Pegu	Myanmar	+ $6\frac{1}{2}$	17	20N	96	29E	– 4	04	– 1	00	– 0	09
Peking	China	+ 8	39	55N	116	28E	– 14	08	– 2	30	– 0	22
Penang	China	+ 7	5	25N	100	14E	– 49	04	– 2	00	– 0	12
Perth	Australia	+ 8	32	00S	115	50E	– 16	40	– 2	30	– 0	22
Philadelphia	U.S.A.*	– 5	39	58N	75	17W	– 1	08	+ 10	30	+ 1	44
Phnom Penh	Cambodia	+ $7\frac{1}{2}$	11	35N	104	57E	– 0	12	– 1	30	– 0	15
Port Elizabeth	South Africa	+ 2	33	58S	25	40E	– 17	20	+ 3	30	+ 0	37
Port Louis	Mauritius	+ 4	20	10S	57	30E	– 10	00	+ 1	30	+ 0	15
Prague	Czecho	+ 1	50	05N	14	24E	– 2	24	+ 4	30	+ 0	45
Prome	Myanmar	+ $6\frac{1}{2}$	18	47N	95	15E	– 9	00	– 1	00	– 0	08
Quebec	Canada*	– 5	46	48N	71	13W	+ 15	08	+ 10	30	+ 1	41
Rangoon	Myanmar	+ $6\frac{1}{2}$	16	47N	96	10E	– 5	20	– 1	00	– 0	09
Rio de Janeiro	Brazil	– 3	22	54S	43	12W	+ 7	12	+ 8	30	+ 1	23
Riyadh	Saudi Arbia	+ 3	24	39N	46	41E	+ 6	44	+ 2	30	+ 0	13
Rome	Italy*	+ 1	41	55N	12	27E	– 10	12	+ 4	30	+ 0	46
Saigon	South Vietnam	+ 8	10	49N	106	41E	– 53	16	– 2	30	– 0	16
San Francisco	U.S.A.*	– 8	37	48N	122	25W	– 9	40	+ 13	30	+ 2	15
Seoul	South Korea	+ 9	37	31N	127	06E	– 31	36	– 3	30	– 0	29
Shanghai	China	+ 8	31	14N	121	28E	+ 5	52	– 2	30	– 0	26
Singapore	Singapore	+ 8	1	21N	103	54E	– 34	24	– 2	30	– 0	14
Sofia	Bulgaria	+ 2	42	41N	23	21E	– 26	36	+ 3	30	+ 0	39
Stockholm	Sweden	+ 1	59	20N	18	00E	+ 12	00	+ 4	30	+ 0	42
Sydney	Australia	+ 10	33	52S	151	12E	+ 4	48	– 4	30	– 0	45
Taipei	Taiwan*	+ 8	23	30N	121	00E	+ 4	00	– 2	30	– 0	25
Taskent	U.S.S.R.	+ $6\frac{1}{2}$	41	20N	69	18E	– 82	48	– 0	30	+ 0	09
Tehran	Iran	+ 3	35	41N	51	26E	– 4	16	+ 2	00	+ 0	20
Tokyo	Japan	+ 9	35	40N	139	33E	+ 18	12	– 3	30	– 0	37
Toronto	Canada*	– 5	43	39N	79	23W	– 17	32	+ 10	30	+ 1	46
Tripoli	Libya	+ 1	32	45N	13	15E	– 7	00	+ 4	30	+ 0	46
Vancouver	Canada	– 8	49	16N	123	07W	– 12	28	+ 13	30	+ 2	16
Vienna	Austria	+ 1	48	12N	16	22E	+ 5	28	+ 4	30	+ 0	44
Volgograd	U.S.S.R	+ 4	48	44N	44	25E	– 62	20	+ 1	30	+ 0	25
Warsaw	Poland*	+ 1	52	12N	21	00E	+ 24	00	+ 4	30	+ 0	40
Washington D.C.	U.S.A.*	– 5	38	55N	77	04W	– 8	16	+ 10	30	+ 1	45
Wellington	New Zealand	+ 12	41	16S	174	47E	– 20	52	– 6	30	– 1	01
Zurich	Switzerland.	+ 1	47	26N	8	22E	– 26	32	+ 4	30	+ 0	49

N. B. Fig. in col. (6) – fig. in col. (5) = Excess of I.S.T. over L.M.T.

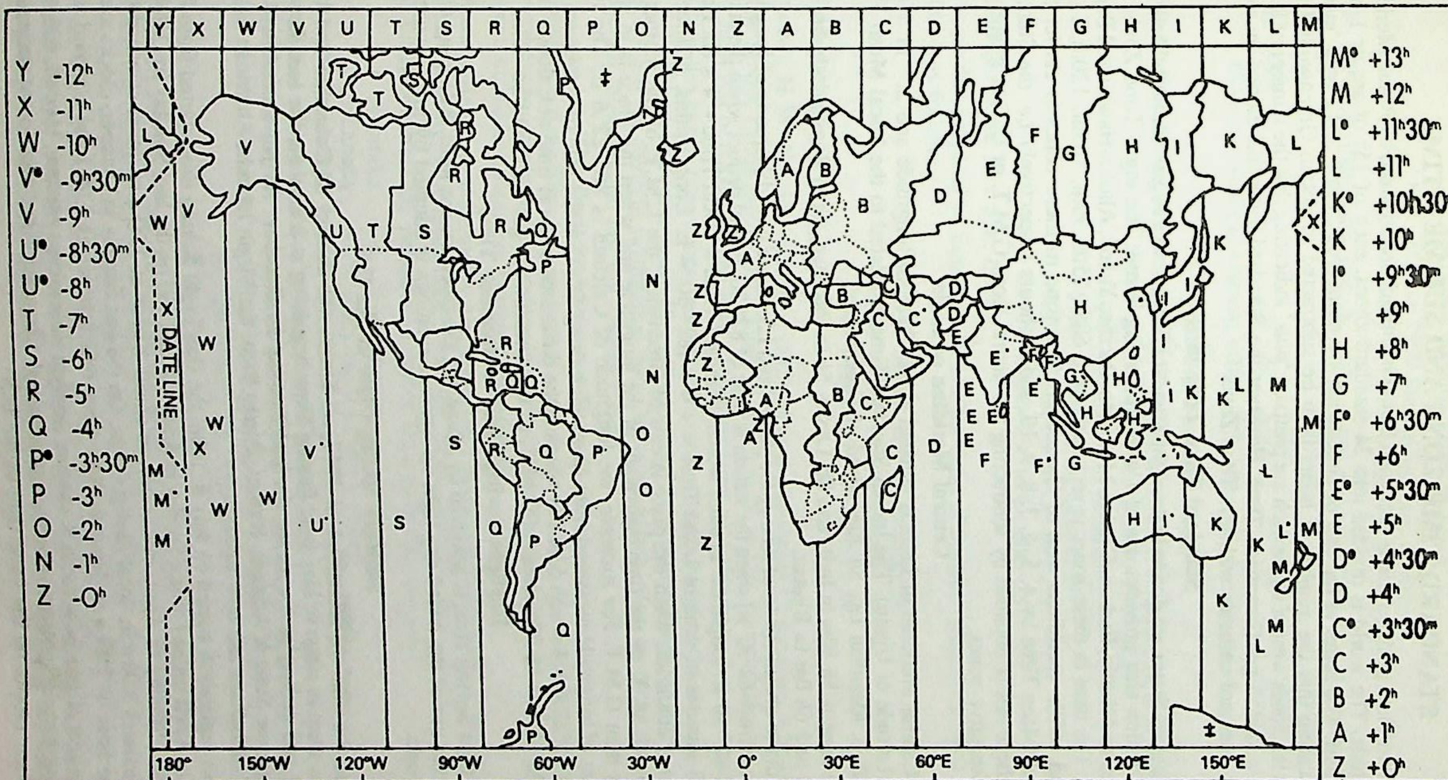
Example for finding I. S. T. and Indian Sidereal time corrections

Place : New York (Long. 74° 00'W). Time Zone is $-5h$
L.M.T. from Z.S.T. = 74°0' × 4*m* = 296*m* 0*s* = 4*h* 56*m*
diff. of L. M. T and Z. S. T. = +4*m*0*s*
I. S. T. from Z. S. T. = – 5*h* – 30*m* = + 10*h* 30*m*

Corr. to Indian Sidereal Time for New York = Difference in long of the place 74°0'W and 82°30'E = 156°–30' = 156°.5

Multiplying by 0.66 seconds, the correction is + 1*m* 43*s*

Standard Time of the World



Some contries keep Daylight Saving Time (Summer Time) which is usually one hour in advance of Standard Time.

Standard Time of the Country = Universal Time + Value from the above Table.

STANDARD TIME ZONE AND SUMMER TIME

Standard Time of the world is reckoned from Greenwich, recognized as Prime Meridian of Longitude. The world is divided into 24 standard zones, each of 15° of arc or 1 hour in time apart. The zones to the east of Greenwich are numbered from 1 to 12 with *'minus'* sign indicating that the number of hours is to be subtracted to obtain Greenwich Time. Similarly the zones west of Greenwich are prefixed *'plus'* indicating that the number of hours are to be added to get Greenwich Time. However the Standard Time maintained by many countries does not coincide with this Time Zone.

Standard Time Zone in the U.S.

The United States are divided into eight Standard Time Zones as per Uniform Time Act of 1966, which also provides use of **Daylight Saving Time**. The eight Time Zones are designated as Atlantic, Eastern, Central, Mountain, Pacific, Yukon, Alaska-Hawaii and Bering (Samoa). The time in these zones is reckoned from 60th, 75th, 90th, 105th, 120th, 135th, 150th and 165th meridians west of Greenwich. The time in these zones is earlier than Greenwich Mean Time by 4, 5, 6, 7, 8, 9, 10, and 11 hours respectively *i,e.* the Standard time of the zones is obtained by subtracting the hours from G.M.T. or U.T as mentioned of the respective zones.

Central Meridian of India

The Central Meridian of India is situated at 82° 30' East longitude and 2[illegible]° 11' North latitude (latitude of Ujjain). The Indian Standard Time is related to the Local Mean Time of 82° 30' E. Meridian *i.e.,* 5*h* 30*m* ahead of Greenwich.

Time zone is 5*h* 30*m* in India and Sri Lanka, 5*h* in Pakistan, 6*h* in Bangladesh, 5*h* 45*m* in Nepal and 6*h* 0*m* in Bhutan.

In India to obtain the *local time of the place* from I.S.T. *add* 4 × [difference of longitude of the place from 82°30' E] when the station is west of 82° 30'. E. and *deduct* when the station is east of 82° 30' E. longitude. In other words, Standard Time = Local Time – 4 × (E. Long. –82° 30') minutes of time or Local Time = + 4 × (82° 30' – E. Long.) mins. of time.

In other countries, when the place is east of Greenwich, the L.M.T. of the moment is more than G. M. T. by the time equivalent of the longitude and when the place is in west, it is less than G.M.T. *For example,* the longitude of Calcutta is 88° 22'.6 E. The time equivalent of longitude measured from Greenwich (long. 0° 0') at the rate of 4 minutes per degree is 88°22'.6 × 4 = +5*h* 53*m* 30*s* which is the difference of local time at Calcutta from G.M.T. As I.S.T is 5*h* 30*m* ahead of G.M.T., so the correction to get I.S.T. will be –23*m* 30*s*.

Daylight Saving Time or Summer Time

Day light Saving Time is achieved by advancing the clock by one hour. Adjusting clock time for the use of the added day light on summer evenings is adopted by many countries of the world.

[illegible] U.S.

Under the [illegible] of 1967, all States, the district of Columbia and U.S. territories were to observe Day light Saving Time beginning at 2 a.m. on the last Sunday in April and ending at 2 a.m. on the [illegible] October. As per amendment for exemption, the State of Arizona, Hawaii, Puerto Rico, the Virgin Islands, American Samao and part of Indiana are now exempt.

As per legislation signed on July 8, 1986, the Day Light Saving time started from first Sunday in April instead of last Sunday in April will still end on the last Sunday in October. On the first Sunday in April, clocks are set ahead 1 hour at 2.00 a.m. local standard time which becomes 3.00 a.m. local daylight time. On the last Sunday in October, clocks are set back, one hour at 2.[illegible] a.m. local daylight time, which becomes 1.00 local standard time.

[illegible] the U.S. observe daylight time except Arizona, Hawaii, and most [illegible] of "Summer Time" [illegible] do not [illegible]y change their clocks on the same date as the U.S.

Daylight Saving Time in the U.S.

From 1996 to 1999 the daylight are as follows :
From first Sunday in April to last Sunday in October

In 1996	Daylight time begins	on	April 7	and ends	on	October 27
In 1997	" "		April 6	" "		October 26
In 1998	" "		April 5	" "		October 25
In 1999	" "		April 4	" "		October 31

(*Source* : Nautical Almanac office, U.S. Naval Observatory, Washington)

British Summer Time

The United Kingdom kept British Summer Time (BST = GMT + 1*h*) during the following periods.
From last Sunday in March to last Sunday in October.

1995 March 26 to October 22
1996 March 31 to October 27
1997 March 30 to October 26
1998 March 29 to October 25

Changes occur at 1 a.m. G.M.T.

As per the proposal of European Union, the dates of Summer Time from 1999 to 2001 would be as follows :

1999 March 28 to October 31
2000 March 26 to October 29
2001 March 25 to October 28

Changes occur at 1 a.m. G.M.T.

(*Source* : H M. Nautical Almanac Office, Royal Greenwich Observatory, Cambridge)

The Soviet Union lies over 11 Time Zones from 2*h* to 12*h*, but maintains its standard time 1 hour fast of the designated zone. It also proclaims daylight saving time as does Europe.

China lies over 5 time zones, but the entire country is placed on zone time *minus* 8 hours with daylight saving from April 12 to September 12. In the Southern Hemisphere many countries observe daylight saving time from October to March. Most countries situated near the equator, however, do not use '*Summer Time*'.

The Period of Summer Time of different Countries

Daylight Saving Time of one hour (*i.e.* when the clocks are advanced by one hour) is followed every year from last Sunday in March to last Sunday in October in the following European countries (dates are however provisional).

Austria, Belgium, Czechoslovakia, Denmark, Finland, Germany, Greece, Hungary, Iraq, Italy, Luxembourg, Norway, Poland, Portugal, Spain, Sweden, Switzerland.

In other countries the period of Summer Time is as follows :—

Australia	—	Late October to late March
Canada	—	Early April to late October
New Zealand	—	Late October to early March
Russia	—	Early April to late October
United Kingdom	—	In 1999 begins on March 28 and ends on October 31
United States	—	In 1999 begins on 1st Sunday on April 4 and ends on last Sunday on October 31.

International Date Line

The International Date Line is a zig-zag line which approximately coincides with the 180th Meridian. The calendar dates are separated from this line. The date is advanced by one day when crossing in westerly direction and set back by one day when crossing in an easterly direction. The line is deflected eastward through the Bering Strait and westward of the Aleutians to prevent separating these area by date. The line is again deflected eastward of the Tonga and New Zealand Islands in the South Pacific.

Standard Time Zones of the World

Country	Time Zone	I. S. T. form Z. S. T.	
	h	h	m
Afganistan	+ 4½	+ 1	00
Algeria	0	+ 5	30
Argentina	− 3	+ 8	30
AUSTRALIA			
Canberra	+ 10	− 4	30
Melbourne	+ 10	− 4	30
Perth	+ 8	− 2	30
Sydney	+ 10	− 4	30
Baharin	+ 3	+ 2	30
Bangladesh	+ 6	− 0	30
Belgium	+ 1	+ 4	30
Bhutan	+ 6	− 0	30
Bolivia	− 4	+ 9	30
BRAZIL	− 3	+ 8	30
Rio de Janeiro	− 3	+ 8	30
Sao Paulo	− 3	+ 8	30
Burundi	+ 2	+ 3	30
Cameroon	+ 1	+ 4	30
CANADA			
Montreal	− 5	+ 10	30
Toronto	− 5	+ 10	30
Vancouver	− 8	+ 13	30
Chile	− 4	+ 9	30
China	+ 8	− 2	30
Columbia	− 5	+ 10	30
Congo	+ 1	+ 4	30
Cuba	− 5	+ 10	30
Denmark	+ 1	+ 4	30
Ecuador	− 5	+ 10	30
Egypt	+ 2	+ 3	30
Ethiopia	+ 3	+ 2	30
Falkland Island	− 4	+ 9	30
Fiji	+ 12	− 6	30
Finland	+ 2	+ 3	30
France	+ 1	+ 4	30
Gambia	0	+ 5	30
Germany	+ 1	+ 4	30
Ghana	0	+ 5	30
Greece	+ 2	+ 3	30
Guatemala	− 6	+ 11	30
Haiti	− 5	+ 10	30
Honduras	− 6	+ 11	30
Hong Kong	+ 8	− 2	30
Iceland	0	+ 5	30
Indonesia	+ 7	− 1	30
India	+ 5½		
Iran	+ 3½	+ 2	00
Iraq	+ 3	+ 2	30
Irish Republic	0	+ 5	30
Israel	+ 2	+ 3	30
Italy	+ 1	+ 4	30
Jamaica	− 5	+ 10	30
Japan	+ 9	− 3	30
Jordan	+ 2	+ 3	30
Kumpuchia	+ 7	− 1	30
Kenya	+ 3	+ 2	30
Korea	+ 9	− 3	30
Kuwait	+ 3	+ 2	30
Lebanan	+ 2	+ 3	30
Libya	+ 1	+ 4	30
Macao	+ 8	− 2	30
Madagascar	+ 3	+ 2	30
Malaysia	+ 8	− 2	30
Maurtius	+ 4	+ 1	30
Mexico	− 6½	+ 11	30
Morrocco	0	+ 5	30
Mozambique	+ 2	+ 3	30
Myanmar (Burma)	+ 6	− 1	00
Nepal	+ 5.45	− 0	15
Netherlands	+ 1	+ 4	30
New Zealand	+ 12	− 6	30
Nicaragua	− 6	+ 11	30
Nigeria	+ 1	+ 4	30
Norway	+ 1	+ 4	30
Oman	+ 4	+ 1	30
Pakistan	+ 5	+ 0	30
Panama	− 5	+ 10	30
Paraguay	− 3	+ 8	30
Philippines	+ 8	− 2	30
Portugal	− 1	+ 6	30
Qatar	+ 3	+ 2	30
Saudi Arabia	+ 3	+ 2	30
Sierra Leone	0	+ 5	30
Singapore	+ 8	− 2	30
South Africa	+ 2	+ 3	30
Spain	+ 1	+ 4	30
Sri Lanka	+ 5½	0	
Sudan	+ 2	+ 3	30
Sweden	+ 1	+ 4	30
Switzerland	+ 1	+ 4	30
Syria	+ 2	+ 3	30
Taiwan	+ 8	− 2	30
Tanzania	+ 3	+ 2	30
Thailand	+ 7	− 1	30
Trinidad	− 4	+ 9	30
Tunisia	+ 1	+ 4	30
Turkey	+ 3	+ 2	30
Uganda	+ 3	+ 2	30
U.K.	0	+ 5	30
Uruguay	− 3	+ 8	30
U.S.A.			
Atlanta	− 5	+ 10	30
Boston	− 5	+ 10	30
Detroit	− 5	+ 10	30
New York	− 5	+ 10	30
Philadelphia	− 5	+ 10	30
Washington D.C.	− 5	+ 10	30
Chicago	− 6	+ 11	30
Dallas	− 6	+ 11	30
Houston	− 6	+ 11	30
Los Angeles	− 8	+ 13	30
San Fransisco	− 8	+ 13	30
FORMER USSR			
Moscow	+ 3	+ 2	30
Tashkent	+ 5	+ 0	30
Vladivostok	+ 10	− 4	30
Venezuela	− 4	+ 9	30
Vietnam	+ 7	− 1	30
Yogoslavia	+ 1	+ 4	30
Zamibia	+ 2	+ 3	30
Zimbabwe	+ 2	+ 3	30

Time Zone + Corr. for I.S. T. from Z. S. T. = 5*h* 30*m*. Day Light Saving Time (Summer Time) usually one hour in advance of Standard Time is kept in some countries.

EPHEMERIS TIME

Due to tidal friction on the Earth's surface there has been regular retardation in the rotation of the Earth, resulting in the gradual lengthenirg of the day and there is also irregulartities in the period of rotation for other reasons. As a result, the *Universal Time* which is the mean solar time of Greenwich determined by the meridian observation, does not increase uniformly. So, a new measure of time, termed as *Ephemeris Time* has been introduced from the year 1960. The relation between the two time scales is E.T. = U.T. + Δ T. From 1984 the term E. T. was replaced by the term Dynamical Time.

Universal Time (U.T.) is the Greenwich Mean Time beginning at midnight. Terrestrrial Dynamical Time (T. D. T.) is the uniform time system which is used in computing the ephemeris of the bodies of the solar system. T.D.T is currently ahead of U.T. by a small amount of Δ T which is determined by observations. So T.D.T=U.T+ΔT

Values of Δ T from 1960 to 1999 A.D. and provisional values from 1995 to 1999

Year	Δ T	Year	Δ T	Year	Δ T	Year	Δ T	Year	Δ T
	s		*s*		*s*		*s*		*s*
1960.0	+33.15	1968.0	+38.29	1976.0	+46.46	1984.0	+53.79	1992.0	+58.31
1961.0	33.59	1969.0	39.20	1977.0	47.52	1985.0	54.34	1993.0	59.12
1962.0	34.00	1970.0	40.18	1978.0	48.53	1986.0	54.87	1994.0	59.98
1963.0	34.47	1971.0	41.17	1979.0	49.59	1987.0	55.32	1995.0	61
1964.0	35.03	1972.0	42.23	1980.0	50.54	1988.0	55.82	1996.0	62
1965.0	35.73	1973.0	43.37	1981.0	51.38	1989.0	56.30	1997.0	63
1966.0	36.54	1974.0	44.49	1982.0	52.17	1990.0	56.86	1998.0	64
1967.0	+37.43	1975.0	+45.48	1983.0	+52.96	1991.0	+57.57	1999.0	+65

Estimated value of ΔT in 1999 is +65 *s* (i.e. 1 minute 5 seconds). Therefore 0*h* G.M.T. or U.T. occurs 65 seconds after 0*h* E.T. or T.D.T. The relation will be 0*h* E. T.= 5*h* 29.0*m* A.M.I.S.T. and 0*h* G.M.T or U. T. = 5*h* 30*m* a.m. I.S.T. The correction to obtain the planetary positions from 5*h* 29*m* to 5*h* 30*m* I.S.T. will be as follows for 1999 based on the estimated value of ΔT = +65*s*

When the value of ·ΔT is 65*s* and the daily motion of planet is 1°, the corr. is + 2".7;. for 5° motion the corr. is + 13".5; for10°the corr. is 27".0 and for 15° daily motion the correction = +40".5. etc. The correction for any intermediate value of motion may be found out by simple interpolation. When the value of ΔT changes, the corrections will also change according to the value of ΔT.

Value of True Ayanamsa for 1st day of each month form 1996 to 2000 A.D

		1996			1997			1998			1999			2000		
		°	'	"	°	'	"	°	'	"	°	'	"	°	'	"
Jan.	1	23	48	11	23	48	56	23	49	41	23	50	25	23	51	12
Feb.	1	23	48	16	23	49	01	23	49	45	23	50	31	23	51	17
Mar.	1	23	48	19	23	49	04	23	49	48	23	50	34	23	51	20
Apr.	1	23	48	22	23	49	06	23	49	51	23	50	36	23	51	23
May	1	23	48	24	23	49	09	23	49	54	23	50	39	23	51	26
June	1	23	48	29	23	49	13	23	49	58	23	50	43	23	51	30
July	1	23	48	34	23	49	18	23	50	03	23	50	48	23	51	35
Aug.	1	23	48	38	23	49	23	23	50	07	23	50	53	23	51	40
Sept.	1	23	48	41	23	49	26	23	50	11	23	50	57	23	51	44
Oct.	1	23	48	44	23	49	28	23	50	13	23	50	59	23	51	47
Nov.	1	23	48	47	23	49	31	23	50	16	23	51	02	23	51	50
Dec.	1	23	48	51	23	49	35	23	50	20	23	51	06	23	51	54

Proportional Logarithms for finding Planets' Places

Minute	Degrees or Hours													Minute
	0	1	2	3	4	5	6	7	8	9	10	11	12	
0	—	1.3802	1.0792	9031	7781	6812	6021	5351	4771	4260	3802	3388	3010	0
1	3.1584	1.3730	1.0756	9007	7763	6798	6009	5341	4762	4252	3795	3382	3004	1
2	2.8573	1.3660	1.0720	8983	7745	6784	5997	5330	4753	4244	3788	3375	2998	2
3	2.6812	1.3590	1.0685	8959	7728	6769	5985	5320	4744	4236	3780	3368	2992	3
4	2.5563	1.3522	1.0649	8935	7710	6755	5973	5310	4735	4228	3773	3362	2986	4
5	2.4594	1.3454	1.0614	8912	7692	6741	5961	5300	4726	4220	3766	3355	2980	5
6	2.3802	1.3388	1.0580	8888	7674	6726	5949	5289	4717	4212	3759	3349	2974	6
7	2.3133	1.3323	1.0546	8865	7657	6712	5937	5279	4708	4204	3752	3342	2968	7
8	2.2553	1.3258	1.0511	8842	7639	6698	5925	5269	4699	4196	3745	3336	2962	8
9	2.2041	1.3195	1.0478	8819	7622	6684	5913	5259	4690	4188	3737	3329	2956	9
10	2.1584	1.3133	1.0444	8796	7604	6670	5902	5249	4682	4180	3730	3323	2950	10
11	2.1170	1.3071	1.0411	8773	7587	6656	5890	5239	4673	4172	3723	3316	2944	11
12	2.0792	1.3010	1.0378	8751	7570	6642	5878	5229	4664	4164	3716	3310	2938	12
13	2.0444	1.2950	1.0345	8728	7552	6628	5866	5219	4655	4156	3709	3303	2933	13
14	2.0122	1.2891	1.0313	8706	7535	6614	5855	5209	4646	4148	3702	3297	2927	14
15	1.9823	1.2833	1.0280	8683	7518	6600	5843	5199	4638	4141	3695	3291	2921	15
16	1.9542	1.2775	1.0248	8661	7501	6587	5832	5189	4629	4133	3688	3284	2915	16
17	1.9279	1.2719	1.0216	8639	7484	6573	5820	5179	4620	4125	3681	3278	2909	17
18	1.9031	1.2663	1.0185	8617	7467	6559	5809	5169	4611	4117	3674	3271	2903	18
19	1.8796	1.2607	1.0153	8595	7451	6546	5797	5159	4603	4109	3667	3265	2897	19
20	1.8573	1.2553	1.0122	8573	7434	6532	5786	5149	4594	4102	3660	3258	2891	20
21	1.8361	1.2499	1.0091	8552	7417	6519	5774	5139	4585	4094	3653	3252	2885	21
22	1.8159	1.2445	1.0061	8530	7401	6505	5763	5129	4577	4086	3646	3246	2880	22
23	1.7966	1.2393	1.0030	8509	7384	6492	5752	5120	4568	4079	3639	3239	2874	23
24	1.7781	1.2341	1.0000	8487	7368	6478	5740	5110	4559	4071	3632	3233	2868	24
25	1.7604	1.2289	0.9970	8466	7351	6465	5729	5100	4551	4063	3625	3227	2862	25
26	1.7434	1.2239	0.9940	8445	7335	6451	5718	5090	4542	4055	3618	3220	2856	26
27	1.7270	1.2188	0.9910	8424	7318	6438	5706	5081	4534	4048	3611	3214	2850	27
28	1.7112	1.2139	0.9881	8403	7302	6425	5695	5071	4525	4040	3604	3208	2845	28
29	1.6960	1.2090	0.9852	8382	7286	6412	5684	5061	4516	4032	3597	3201	2839	29
30	1.6812	1.2041	0.9823	8361	7270	6398	5673	5051	4508	4025	3590	3195	2833	30
31	1.6670	1.1993	0.9794	8341	7254	6385	5662	5042	4499	4017	3583	3189	2827	31
32	1.6532	1.1946	0.9765	8320	7238	6372	5651	5032	4491	4010	3576	3183	2821	32
33	1.6398	1.1899	0.9737	8300	7222	6359	5640	5023	4482	4002	3570	3176	2816	33
34	1.6269	1.1852	0.9708	8279	7206	6346	5629	5013	4474	3994	3563	3170	2810	34
35	1.6143	1.1806	0.9680	8259	7190	6333	5618	5003	4466	3987	3556	3164	2804	35
36	1.6021	1.1761	0.9652	8239	7174	6320	5607	4994	4457	3979	3549	3157	2798	36
37	1.5902	1.1716	0.9625	8219	7159	6307	5596	4984	4449	3972	3542	3151	2793	37
38	1.5786	1.1671	0.9597	8199	7143	6294	5585	4975	4440	3964	3535	3145	2787	38
39	1.5673	1.1627	0.9570	8179	7128	6282	5574	4965	4432	3957	3529	3139	2781	39
40	1.5563	1.1584	0.9542	8159	7112	6269	5563	4956	4424	3949	3522	3133	2775	40
41	1.5456	1.1540	0.9515	8140	7097	6256	5552	4947	4415	3942	3515	3126	2770	41
42	1.5351	1.1498	0.9488	8120	7081	6243	5541	4937	4407	3934	3508	3120	2764	42
43	1.5249	1.1455	0.9462	8101	7066	6231	5531	4928	4399	3927	3501	3114	2758	43
44	1.5149	1.1413	0.9435	8081	7050	6218	5520	4918	4390	3919	3495	3108	2753	44
45	1.5051	1.1372	0.9409	8062	7035	6205	5509	4909	4382	3912	3488	3102	2747	45
46	1.4956	1.1331	0.9383	8043	7020	6193	5498	4900	4374	3905	3481	3096	2741	46
47	1.4863	1.1290	0.9356	8023	7005	6180	5488	4890	4365	3897	3475	3089	2736	47
48	1.4771	1.1249	0.9330	8004	6990	6168	5477	4881	4357	3890	3468	3083	2730	48
49	1.4682	1.1209	0.9305	7985	6975	6155	5466	4872	4349	3882	3461	3077	2724	49
50	1.4594	1.1170	0.9279	7966	6960	6143	5456	4863	4341	3875	3454	3071	2719	50
51	1.4508	1.1130	0.9254	7947	6945	6131	5445	4853	4333	3868	3448	3065	2713	51
52	1.4424	1.1091	0.9228	7929	6930	6118	5435	4844	4324	3860	3441	3059	2707	52
53	1.4341	1.1053	0.9203	7910	6915	6106	5424	4835	4316	3853	3434	3053	2702	53
54	1.4260	1.1015	0.9178	7891	6900	6094	5414	4826	4308	3846	3428	3047	2696	54
55	1.4180	1.0977	0.9153	7873	6885	6081	5403	4817	4300	3838	3421	3041	2691	55
56	1.4102	1.0939	0.9128	7854	6871	6069	5393	4808	4292	3831	3415	3034	2685	56
57	1.4025	1.0902	0.9104	7836	6856	6057	5382	4798	4284	3824	3408	3028	2679	57
58	1.3949	1.0865	0.9079	7818	6841	6045	5372	4789	4276	3817	3401	3022	2674	58
59	1.3875	1.0828	0.9055	7800	6827	6033	5361	4780	4268	3809	3395	3016	2668	59
	0	1	2	3	4	5	6	7	8	9	10	11	12	

Proportional Logarithms— *contd.*

Minute	13	14	15	16	17	18	19	20	21	22	23	Minute
	DEGREES OR HOURS											
0	2663	2341	2041	1761	1498	1249	1015	0792	0580	0378	0185	0
1	2657	2336	2036	1756	1493	1245	1011	0788	0577	0375	0182	1
2	2652	2330	2032	1752	1489	1241	1007	0785	0573	0371	0179	2
3	2646	2325	2027	1747	1485	1237	1003	0781	0570	0368	0175	3
4	2640	2320	2022	1743	1481	1233	0999	0777	0566	0365	0172	4
5	2635	2315	2017	1738	1476	1229	0996	0774	0563	0361	0169	5
6	2629	2310	2012	1734	1472	1225	0992	0770	0559	0358	0166	6
7	2624	2305	2008	1729	1468	1221	0988	0767	0556	0355	0163	7
8	2618	2300	2003	1725	1464	1217	0984	0763	0552	0352	0160	8
9	2613	2295	1998	1720	1459	1213	0980	0759	0549	0348	0157	9
10	2607	2289	1993	1716	1455	1209	0977	0756	0546	0345	0154	10
11	2602	2284	1988	1711	1451	1205	0973	0752	0542	0342	0150	11
12	2596	2279	1984	1707	1447	1201	0969	0749	0539	0339	0147	12
13	2591	2274	1979	1702	1443	1197	0965	0745	0535	0335	0144	13
14	2585	2269	1974	1698	1438	1193	0962	0741	0532	0332	0141	14
15	2580	2264	1969	1694	1434	1190	0958	0738	0529	0329	0138	15
16	2574	2259	1965	1689	1430	1186	0954	0734	0525	0326	0135	16
17	2569	2254	1960	1685	1426	1182	0950	0731	0522	0322	0132	17
18	2564	2249	1955	1680	1422	1178	0947	0727	0518	0319	0129	18
19	2558	2244	1950	1676	1417	1174	0943	0724	0515	0316	0126	19
20	2553	2239	1946	1671	1413	1170	0939	0720	0512	0313	0122	20
21	2547	2234	1941	1667	1409	1166	0935	0716	0508	0309	0119	21
22	2542	2229	1936	1662	1405	1162	0932	0713	0505	0306	0116	22
23	2536	2223	1932	1658	1401	1158	0928	0709	0501	0303	0113	23
24	2531	2218	1927	1654	1397	1154	0924	0706	0498	0300	0110	24
25	2526	2213	1922	1649	1392	1150	0920	0702	0495	0296	0107	25
26	2520	2208	1917	1645	1388	1146	0917	0699	0491	0293	0104	26
27	2515	2203	1913	1640	1384	1142	0913	0695	0488	0290	0101	27
28	2509	2198	1908	1636	1380	1138	0909	0692	0484	0287	0098	28
29	2504	2193	1903	1632	1376	1134	0906	0688	0481	0284	0095	29
30	2499	2188	1899	1627	1372	1130	0902	0685	0478	0280	0091	30
31	2493	2183	1894	1623	1368	1127	0898	0681	0474	0277	0088	31
32	2488	2178	1889	1618	1364	1123	0894	0678	0471	0274	0085	32
33	2483	2173	1885	1614	1359	1119	0891	0674	0468	0271	0082	33
34	2477	2168	1880	1610	1355	1115	0887	0671	0464	0267	0079	34
35	2472	2164	1875	1605	1351	1111	0883	0667	0461	0264	0076	35
36	2467	2159	1871	1601	1347	1107	0880	0663	0458	0261	0073	36
37	2461	2154	1866	1597	1343	1103	0876	0660	0454	0258	0070	37
38	2456	2149	1862	1592	1339	1099	0872	0656	0451	0255	0067	38
39	2451	2144	1857	1588	1335	1095	0869	0653	0448	0251	0064	39
40	2445	2139	1852	1584	1331	1091	0865	0649	0444	0248	0061	40
41	2440	2134	1848	1579	1326	1088	0861	0646	0441	0245	0058	41
42	2435	2129	1843	1575	1322	1084	0858	0642	0438	0242	0055	42
43	2430	2124	1838	1571	1318	1080	0854	0639	0434	0239	0052	43
44	2424	2119	1834	1566	1314	1076	0850	0635	0431	0236	0049	44
45	2419	2114	1829	1562	1310	1072	0847	0632	0428	0232	0046	45
46	2414	2109	1825	1558	1306	1068	0843	0628	0424	0229	0042	46
47	2409	2104	1820	1553	1302	1064	0839	0625	0421	0226	0039	47
48	2403	2099	1816	1549	1298	1061	0835	0622	0418	0223	0036	48
49	2398	2095	1811	1545	1294	1057	0832	0618	0414	0220	0033	49
50	2393	2090	1806	1540	1290	1053	0828	0615	0411	0216	0030	50
51	2388	2085	1802	1536	1286	1049	0825	0611	0408	0213	0027	51
52	2382	2080	1797	1532	1282	1045	0821	0608	0404	0210	0024	52
53	2377	2075	1793	1528	1278	1041	0817	0604	0401	0207	0021	53
54	2372	2070	1788	1523	1274	1038	0814	0601	0398	0204	0018	54
55	2367	2065	1784	1519	1270	1034	0810	0597	0394	0201	0015	55
56	2362	2061	1779	1515	1266	1030	0806	0594	0391	0197	0012	56
57	2356	2056	1774	1510	1261	1026	0803	0590	0388	0194	0009	57
58	2351	2051	1770	1506	1257	1022	0799	0587	0384	0191	0006	58
59	2346	2046	1765	1502	1253	1018	0795	0583	0381	0188	0003	59
	13	14	15	16	17	18	19	20	21	22	23	

Example :— Required longitude of Moon on 14th April, 1999 at 11*h* 16*m* a.m. I.S.T. (Time of transit of Sun into *Mesha Rasi*). Longitude of Moon on 14th April at 5-30 a.m. I.S.T. is 10^s 29° 40'. Daily motion of Moon on that date is 14° 34'. Log. of 14° 34' = 0.2168. Time of the event from 5*h* 30*m* a.m. is 5*h* 46*m*, log. of which 0.6193. Sum of these two = 0.2168 + 0.6193 = 0.8361 which is log. of 3° 30'. So movement of Moon from 5-30 a.m. on that date is 3° 30'. The required longitude of Moon is, therefore, 10^s 29° 40' + 3° 30' = 11^s 3° 10' *i.e.* *Mina* 3° 10'. For greater accuracy, *Interpolation correction* may be taken.

Rule :— Add proportional log. of planet's daily motion to log. of time from 5-30 a.m., I.S.T. and the sum will be the log. of the movement required. If the time be after 5-30 a.m., add this movement to the given position of planet, but if before subtract, and the result will be the planet's true place at the given moment (if retrograde, subtract for add). For accurate position of Moon, interpolation correction is to be taken. (See *Interpolation*).

GLOSSARY

Definitions of some astronomical, astrological and calendarial terms :

Ephemeris— A tabulation of the positions of a celestial object in an orderly sequence for a number of dates—usually for one whole year.

Zodiac— An imaginary belt stretching about 9° north and 9° south of the ecliptic within which the planets and the Moon remain in course of their movement. In case of the Moon, the deviation from the ecliptic is about ±5°. The belt is divided into 12 equal sectors each of 30° and each sector called a 'sign' or *Rasi*. According to the western system of reckoning (i.e. *Sayana* system) the first *rasi i.e.* Aries starts from the point of intersection of the ecliptic and the equator. There are 12 signs or *rasis* in both the systems, the first being *Mesha* or Aries.

Tropical (or Sayana) Longitude— Tropical longitude of any celestial body is defined as the arc of the ecliptic intercepted between the first point of Aries and a perpendicular arc to the ecliptic drawn through the body. It is measured along the ecliptic from the vernal equinoctial point *viz.* point of intersection of the ecliptic and equator of date. Such longitudes are called tropical or *Sayana* longitude. As the equinoctial point is slowly moving backwards at the rate of nearly 50".3 per year due to precession of the equinoxes, the tropical or *Sayana* longitudes of all celestial bodies are gradually increasing on this account. In Indian astronomy, the initial point from which the longitude is measured is a fixed point on the ecliptic, so that the longitude of fixed stars might not undergo any change due to precession of the equinoxes. The angular distance between the above fixed initial point and the vernal equinoctial point is known as *Ayanamsa*. This fixed zodiac system is known as *Nirayana* system of reckoning in India Astronomy.

The apparent geocentric *longitude* and *latitude* of planets and stars are referred to the true equinox and ecliptic of date and are corrected for planetary aberration.

Celestial Latitude—Angular distance across the celestial sphere measured north or south from the ecliptic along the great circle passing through the poles of the ecliptic and the object.

Ayanamsa —The vernal equinoctial point or the First point of Aries is taken as the starting point for measuring of celestial longitudes. The celestial longitude of a heavenly body measured from this initial point is known as the tropical or *Sayana* longitude. Due to precession of the equinoxes (*ayana chalana)* the V.E. point is receding back over the ecliptic at the rate of about 50".3 per year, as a result of which the longitudes of fixed stars are increasing every year at the same rate. In order to stabilize the zodiac, a point has been taken as the origin which is permanently fixed on the ecliptic and this point is different from the V.E. point. The distance between this fixed initial point and the V.E. point or in other words the tropical longitude of the initial point is called *Ayanamsa*. The zodiac starting from this fixed origin is known as sidereal zodiac or *nirayana* zodiac. The tropical longitude of any celestial object *minus* the amount of ayanamsa on that date gives the *nirayana* longitude. The *nirayana* and the *sayana* zodiac conicided in 285 A.D. when the ayanamsa was zero. (*See* also page 3 for further information).

Mean Ayanamsa for any date = Mean values of ayanamsa + precession in longitude for that date.

True Ayanamas = Mean ayanamsa + nutation in longitude.

Transit of Planets—The transit time of Sun, Moon and planets is the time of its entrance into the signs of the zodiac (*rasis)* either tropical or sidereal or into the sidereal nakshatra divisions or its quadrants.

Heliacal Rising and Setting—The planets Mercury to Saturn (as well as the Moon) remain invisible to the naked eye for some days at the time of conjunction with the Sun. The phenomenon of the planets' (or the Moon's) invisibility due to its proximity to the Sun is known as combust or heliacal setting of the planets. The opposite phenomenon is defined as heliacal rising.

Tithi— Tithi or 'Lunar day' is a very important conception in Hindu astronomy. A tithi is completed when the longitude of the Moon gains exactly 12° degrees or its multiple on that of the Sun and as such there are 30 tithis in a lunar month. A difference in longitude of 12° indicates the ending of the 1st tithi, 24° that of the second tithi and so on. Tithis are shown from Sukla 1 to Sukla 15 (*Purnima* or Full Moon) and again from Krishna 1 to Krishna 14 and then Krishna 30 (known as *Amavasya* or New Moon).

Nakshatra— A nakshatra is completed when the *nirayana* longitude of the Moon as measured from the fixed initial point attains a value of 13° 20' or a multiple thereof. When the longitude is 13° 20', the first nakshatra (*i.e. Asvini*) ends, when the same is 26° 40' the second nakshatra (*Bharani*) ends and so on. There are thus 27 nakshatras which completes the circle of 360°.

Yoga—Like nakshatras, there are 27 yogas. A yoga is obtained from the sum of the nirayana longitude of the Moon and the Sun and the sum is divided into 27 parts of 13° 20' each. The first yoga (*Viskumbha*) ends when the sum is 13° 20', second yoga (*Priti*) ends when it is 26° 40' and so on.

Karana—A Karana is completed when the nirayana longitude of the Moon gains every 6° on that of the Sun. In each *tithi* there are two Karanas covering the two halves of the *tithimana.*

Solar months—The Solar months are determined according to the transit time of Sun's entry into twelve signs (like *Mesha, Vrisha* etc.) each of angular distance of 30°. There are various rules for determining the beginning of the solar months which are followed in different States.

Ascendant (Lagna)—The Ascendant or the orient ecliptic point is the point of intersection of the ecliptic at the given time with the eastern horizon of the place. In astrology, it is the first house of the horoscope and is also some times called the horizon. This point of intersection is very important as it is considered as the commencing point of the horoscope. The Earth rotates on its axis from west to east in 23*h* 56*m* 4.091*s* in mean solar time, and due to this rotatory motion, the whole sky appears to come up from below the horizon gradually. It is the '*Rising Sign*' in the eastern horizon. The period of each *lagna* is not equal like the *Rasi* division and slightly varies from place to place. There are 12 *lagnas* and their namings are the same as those of *rasi, e.g. Mesha, Vrisha,* etc.

Tenth House or M.C.—The point of intersection of the ecliptic of the given time with the meridian of the place is the tenth house for that moment. It is also termed as the mid-heaven or the Medium Coeli (M.C.) and is also sometimes called simply the meridian. The longitude of this point is, as usual, measured along the ecliptic from the first point of Aries. The right ascension of the M.C. is the sidereal time of the moment which is often called R.A.M.C.

Lunation—The month or lunation used in astronomy is the mean synodic period, which is the number of days comprised within a large number of lunations divided by the number of lunations. The present duration of lunation is 29.530589 days or $29^d12^h44^m2^s.9$.

Lunar months—The lunar month is the time-period from completion of new-moon (conjunction of Moon with the Sun) to the next new-moon. There are two kinds of lunar months used in India, the new-moon ending and the full-moon ending. The *new moon ending* lunar months covers the period from one new-moon to the next. This is known as *Amanta* or *Sukladi system*. The day next to *Amavasya* is the first day of the month. The *full-moon ending* lunar month known as *Purnimanta* covers the period from one full moon to the next and begins from the day after full moon. This is known as the *Krishnadi system.* In this two systems naming of the months in *Sukla paksha* is the same, but in *Krishna paksha* the next lunar month is denoted, *e.g. Chaitra Sukla* in Sukladi system is equivalent to *Chaitra Sudi* in *Krishnadi* system, but *Chaitra Krishna* in Sukladi system is equivalent to *Vaisakha Vadi* in *Krishnadi* system and so on.

Sidereal time — The Sidereal time is the measure of time defined by the diurnal motion of the vernal equinox. Sidereal time system is derived from the Earth's rotation with respect to the stars. Local sidereal time is defined as the local hour angle of the vernal equinox. It is 0*h* at the instant when the vernal equinox is at the upper transit of the local meridian. Sidereal time is determined from observation of meridian transits of stars. Sidereal time at any instant is defined to be the west hour angle of the First Point of Aries (Vernal equinoctial point) from the upper meridian of the place. At mean noon *i.e.* 12 hour local mean time on any day sidereal time is the Right Ascension of the fictitious mean Sun, which is defined to be the tropical mean longitude of the Sun at the moment, as affected by mean aberration. Sidereal time system is derived from the Earth's rotation with respect to the stars. The duration of sidereal day in mean solar time is 23*h* 56*m* 4.091*s*. Sidereal time for a particular place and particular time increases per day at the rate of 24*h* +3*m* 56.55536*s*.

Ephemeris time— Due to tidal friction on the Earth's surface there has been regular retardation in the rotation of the Earth, resulting in the gradual lengthening of the day and there is also irregularities in the period of rotation for other reasons. As a result, the *Universal Time* which is the mean solar time of Greenwich determined from meridian observations, does not increase uniformly. So a new measure of time, termed as *Ephemeris Time,* has been introduced from the year 1960. The relation between the two time scales is E.T. = U. T. + Δ T. From 1984 the term E.T. was replaced by the term *Dynamical Time.*

Universal time—U.T. is the Greenwich Mean Time beginning at midnight.

Terrestrial Dynamical Time— (T.D.T.) is the uniform time system which is used in computing the ephemeris of the bodies of the solar system. T.D.T. is currently ahead of U.T. by a small amount of ΔT.

Hour Angle—The angular distance on the celestial sphere measured westward, along the celestial equator from the meridian to the hour circle that passes through a celestial object.

Apparent Noon—Apparent Noon is the local mean time of Sun's meridian passage, *viz.*, the mid day.

Right Ascension—Right Ascension of any celestial object in the angular distance on the celestial sphere measured eastward along the celestial equator from the vernal equinox to the hour circle passing through the celestial object.

Declination—It is the angular distance on the celestial sphere north or south of the celestial equator. It is measured along the hour circle passing through the celestial object.

Hour Circle—A great circle on the celestial sphere that passes through the celestial poles and is perpendicular to the celestial equator.

Geocentric position—Observations with reference to the centre of the Earth is termed as geocentric.

Heliocentric position—Observations with reference to the centre of the Sun is termed as heliocentric.

Mean Solar time—A measure of time based on the diurnal motion of the fictitious mean Sun assuming that the Earth's rate of rotation is constant.

Node—The two points on the celestial sphere at which the plane of an orbit of any rotating celestial object intersects a reference plane. In respect of the Moon, these two points are known as *Rahu* (Ascending Node) and *Ketu* (Descending Node).

Occultation—Obscuration of one celestial body by another of greater apparent diameter, especially the passage of the Moon in front of a star or a planet.

Eclipse—Obscuration of a celestial body caused by its passage through the shadow cast by another body.

In a *solar eclipse,* the Earth passes through the shadow cast by the Moon *i.e.* the Moon comes between the Earth and the Sun. It is *total* when the observer is in the Moon's *Umbra, partial* when observer in the Moon's *penumbra* and *annular* when the solar disc is not completely covered but seen as a ring at maximum eclipse. An *annular eclipse* occurs when the apparent disc of the Moon is smaller than that of the Sun.

In a *lunar eclipse,* the Moon passes through the shadow cast by the Earth, *i.e.* the Earth comes between the Sun and the Moon. It is *total* when the Moon passes completely through the shadow cast by the Earth. It is *partial* when the Moon passes partially through the Earth's *umbra* at maximum eclipse. The eclipse is *penumbral* when the Moon passes only through the Earth's *penumbra.*

Maximum number of eclipse that may occur in a year may be 7, while the minimum number is 2.

Apparent place of any celestial object—The position at which the clestial object would actually be seen from the centre of the Earth, displaced by planetary aberration and referred to the true equinox and equator.

Glossary

Meridian passage—Meridian is defined to be a great circle passing through the zenith and the celestial poles. It corresponds to geographical longitude of a place. A star or a plenet passes over the meridian when the sidereal time of the moment becomes equal to the Right Ascension of the star or planet.

Conjunction—When the apparent celestial longitude or Right Ascension of two bodies are the same, the phenomenon is called conjunction.

Opposition—When the apparent celestial longitude of two bodies differs by 180°, the phenomenon is called opposition.

Inferior planets—The planets whose orbits lie within the Earth's orbit round the Sun, are termed as inferior planets. The planets Mercury and Venus are regarded as inferior planets.

Superior planets—The planets whose orbits lie outside that of the Earth are termed as superior planets. The planets Mars, Jupiter, Saturn etc. are superior planets.

Square—When the apparent celestial longitude of two bodies differs by 90° or 270°, the phenomenon is called square.

Direct motion —For orbital motion in the solar system, motion that is counter-clockwise in the orbit as seen from the north pole of the ecliptic. For an object observed on the celsetial sphere, motion that is from west to east, resulting from the relative motion of the object and the Earth (*i.e.* forward motion of any celestial object).

Retrograde motion—Motion that is clockwise in the orbit as seen from the north pole of the ecliptic. For an object observed on the celestial sphere, motion from east to west resulting from the relative motion of the object and the earth.

Although the planets always move in the same direction round the Sun, the apparent motion as seen from the Earth is not always in the same forward direction. They sometimes appear to move also in the backward direction. This is known as *retrograde motion* of a planet.

Greatest Elongation—The instants when the geocentric angular distances of Mercury and Venus are at a maximum from the Sun.

Equinox—The two points on the celestial sphere at which the ecliptic intersects the celestial equator. When the apparent longitude of the Sun is 0°, it is Vernal equinox and when 180°, it is Autumnal equinox. Day and night are equal on these points.

Solstice—The times of solstices are those at which the Sun's apparent longitude is 90° (summer solstice) and 270° (winter solstice). At summer solstice the day is longest and at winter solstice the day is shortest for observers in the northern hemisphere.

Ecliptic—The mean plane of the Earth's orbit around the Sun or simply the apparent path of the Sun in the sky during the course of a year is known as ecliptic. It is a great circle cutting the celestial equator at an angle of about $23\frac{1}{2}$°. The angle varies from 22° 55' to 24° 13'. This is known as the *obliquity of the ecliptic*.

Celestial equator—It is a great circle of the celestial sphere drawn halfway between the poles and is the great circle in which the plane of the earth's equator cuts the celestial sphere.

Inferior and Superior Conjunction—The geocentric inferior conjunction of Mercury and Venus occurs when the planet is between the Earth and the Sun and superior conjunction occurs when the Sun is between the planet and the Earth.

Nutation—Nutation is essentially that part of the precessional motion of the pole of the Earth's equator which depends on the periodic motion of the Sun and the Moon in their orbit around the Earth.

Osculating elements—The osculating elements are the elements of the instantaneous ecliptic orbit of the planets around the Sun determined by its actual position and velocity components for the instant, and so the elements are affected by the attractions of other planets.

Stationary, Direct and Retrograde point of a planet—The position at which the rate of change of the apparent longitude or right ascension is momentarily zero.

Meridian Circle—A great circle passing through to celestial poles and through the zenith of any place on Earth.

Obliquity—The angle between the equatorial and the orbital planes of a body. In Earth the obliquity of the ecliptic is the angle between the planes of the equator and the ecliptic.

Magnitude of a lunar eclipse—The fraction of the lunar diameter obscured by the shadow of the Earth at the greatest phase.

Magnitude of a solar eclipse—The fraction of the solar diameter obscured by the Moon at the greatest phase of a solar eclipse.

Aberration—The apparent angular displacement of observed position of celestial object from its geometric position, caused by the velocity of light in combination with the motions of the observer and of the observed object.

Aphelion—The point on a planetary orbit when it is at the greatest distance from the Sun. The Sun's radius vector is the longest at this point (heliocentric).

Perihelion—The point on a planetary orbit when it is at the least distance from the Sun. The Sun's radius vector is the shortest at this point. (heliocentric).

Perigee—The point at which a body in orbit around the Earth is at the least distance from the earth.

Apogee—The point at which a body in orbit around the Earth is at the greatest distance from the Earth.

Aspect—The apparent position of any of the planets or the Moon relative to the Sun as observed from the Earth and angular relationship between two celestial objects. Details of the degrees of the aspects are discussed in chapter on Aspects and Phenomena.

First Quarter & Last Quarter—When the apparent celestial longitude of Moon differs by 90° and 270° over the Sun's apparent longitude, the phenomena is called first quarter and last quarter respectively.

Constellation—A group of stars, bearing the names of mythical Greek heroes and of objects occurring in Greek legends to identify an area of the celestial sphere.

Twilight—The time interval preceding sunrise and following sunset during which the sky is partially illuminated.

Tropical Year—The tropical year or the year of seasons, is the time of the passage of the Sun from one vernal equinox to the next vernal equinox. The vernal equinoctial point slips to the west at the rate of about 50" per year. Therefore, the Sun has to travel 360° 0' 0" (–)50" = 359° 59' 10" to arrive at the new vernal equinoctial point, hence the duration of the tropical year is ***less*** than that of the sidereal year by about 2C minutes 25 seconds as at present.

Julian Day Number—The Julian Day number is the number assigned to a day in a continuous count of days beginning with the Julian day number 0 assigned to the day starting at Greenwich mean noon on Jan. 1,4713 B.C.

Julian date—Julian date of any instant is the Julian day number plus the fraction of the day since the preceding noon and it is interval of time in days since 4713 B.C. January 1, Greenwhich Noon.

Sidereal Period—Sidereal Period of planets is the time taken to make one complete circuit of the Sun. In case of Moon it is the time taken to make one complete circuit of the earth.

Synodic Period—Interval between one New Moon and the next.

Sidereal Year—The sidereal year is the mean period of revolution of the Earth in its orbit with respect to the background stars (from fixed star to fixed star). Due to precession of the equinoxes, the tropical year is less than the sidereal year by the time taken by the Sun to traverse 50" *i.e.* by 0.014172 days or about 20^m 25^s as at present.

The length of the sidereal year is 365.256363 in mean solar days. The solar day is larger than the sidereal day, because by the time the earth completes a rotation about its axis, the Sun slips

nearly a degree to the east, due to motion of the earth in its orbit and it takes a little more time for the Sun to come to the meridian of the place.

Sidereal Day—The Sidereal day is defined in astronomy as the period between two successive meridian passages of the First point of Aries. As this point has a slow westward motion among the fixed stars, the duration of the so called sidereal day is very slightly less than the actual sidereal day or the period of rotation of the Earth.

Eclipse Year—The eclipse year or the draconitic year is the mean interval between successive passages of the Sun through node, *i.e.* the time taken by the Sun to return to the same node, is known as draconitic year or the year of dragons.

Anomalistic Year—The anomalistic year is the mean interval between successive passages of the Earth through perihelion (perigee to perigee).

Savana Year—The months of the calendar consists of 30 days each and the year is of 360 days.

Uttarayana—The period covering the north-ward journey of the Sun is know as *Uttarayana, i.e.* northward passage and it consist of Winter, Spring and Summer seasons. It is the period from winter solstice to summer solstice. The period starts from Sun's entry into Capricornus (Sayana *Makara)* on December 21-22.

Dakshinayana—It is the period from summer solstice to winter solstice *i.e.* southward passage of the Sun and it consist of Rains, Autumn and *Hemanta* seasons. The period starts from Sun's entry into Cancer (Sayana *Karkata*) on June 20-21.

Shri Chaitanyabda—The year 1 begins from Phalguni Purnima of 1407 Saka or 1486 A. D. (Birthday tithi of Shri Chaitanya)

National Calendar of India—The year of National Calendar begins from March 22 in an ordinary year and March 21 in a leap year. First month of the Calender is *Chaitra* (Solar month). Saka Era has been adopted as the main Era. The calendar was introduced by the Govt. of India which effect from 22nd March, 1957 corresponding to Chaitra 1, 1879 Saka.

Vikram Samvat (Luni-solar)—Vikram Samvat begins from the tithi of Chaitra Sukla 1 (Sukla Pratipad) according to the *Chaitradi system,* and from Kartika Sukla 1 on *Kartikadi system* (in Gujarat) and from Vaisakhi (solar) in Panjab. The Vikram Samvat started from 57 B.C.

Saka Era (Solar & Luni-solar)—Saka Era begins from (1) March 22 or March 21 of the National Calendar (Solar), (2) From Chaitra Sukla Pratipad (Luni-solar) and (3) Vaisakhadi (Solar). Saka era started from 78 A.D.

Bengali San (Solar)—The year begins from Vaisakhadi (*i.e.* day following transit of the Sun to Mesha rasi). Bengali San 963 started in 1556 A.D.

Fusli Era (Luni-solar)—Fusli Era begins from Bhadra Krishna Pratipada tithi of 592 A. D.

Kollam Era (Solar)—The year begins from the day of transit of Sun into Simha Rasi and the first month is Simha. The year started from 824 A.D.

Kaliyuga Era (Solar)—The Kaliyuga Era is measured by the number of years elapsed since 3102 B.C. (–3101 A.D.) Feb. 17-18 midnight (Ujjain), when the mean Sun according to Surya Siddhanta became zero.

Buddha Nirvana Era (Luni-Solar)—The year begins from Vaisakhi Purnima (S15) of 545 B.C. (–544 A.D.).

Mahavira Nirvana Era (Luni-Solar)—The year begins from Kartika Sukla 1 of 528 B.C. (–527 A.D.).

Hejira (Lunar)—The year started from 622 A.D. The first month of the year is Muharram of the Islamic calendar. It consists of 12 lunar months, the beginning of each month being determined by the first visibility of the lunar crescent after new-moon. No intercalation is made for determination of month. The year makes a circuit of the seasons in every 33 years.

***Barhaspatya Varsha (or the Jovian year)* of South India**—The year commences from *Prabhava* which are 60 in number and is used as the era in the Tamilian calendar, the year of which begins on April 13-14. It is also used in the Telugu calendar and the Mysorian calendar which are luni-solar and the year begins with lunar *Chaitra* after the new-moon day falling between March 14 and April 13-14.

Barhaspatya Varsha of North India—In North India there are also 60 Jovian years with the same name as in the South starting from *Prabhava* as No. 1. The years are determined by the entry of Jupiter (*Brihaspati*) by mean motion into different *Rasis* beginning from *Kumbha* rasi.

Bhaskarabda of Assam (Solar)—Same as Bengali San (Solar).

Sankarabda of Assam (Luni-Solar)—The year 1 begins from Asvina Sukla Dasami tithi of 1448 A.D. (or 1449 A.D.—in some opinion) birthday tithi of Shri Sankara Deva of Assam.

Nabanassar Era (Babylon)—The Era of Nabanassar was extensively used by Ptolemy and early astonomers for dating observations and constructing astronomical tables. It is reckoned from the accession of Nabanassar to the throne of Babylon in 747 B.C. but there is no certain evidence that it was actually used as an historical Era.

The Julian Calendar—The Julian Calendar was established in the Roman Empire by Julius Caesar in 46 B.C. by revising the previous local calendars of Rome, with the advice of the astronomer Sosigenes. It remained in general use in the West until 1582, when it was further modified into the Gregorian Calendar which has come into worldwide use for civil purposes.

The Gregorian Calendar— The Julian year of 365.25 days was longer than the true year of 365.2422 by .0078 days and so discrepancy was noticed in the observance of Easter Day. In 1582 the error in the calendar reckoning accumulated to 10 days. In 1582 Pope Gregory XIII revised the calendar and ordained that Friday, October 5 of that year was to be counted as Friday. October 15. For the future, centurial years that were not divisible by 400 were not to count as leap-years.

As such the century years 1600, 2000, 2400 which are divisible by 400 are leap years whereas the century years 1700, 1800, 1900, 2100 although divisible by 4, are not leap years.

As a result the number of leap-years in 400 years was reduced from 100 to 97 and the year-length of the calendar thus became 365.2425 days, the error being only one day in 3300 years. In Great Britain, it was officially introduced in 1752 when the error accumulated to 11 days and in that year 3rd September of Julian Calendar Thursday was designated as the 14th September of Gregorian Calendar Thursday. At the same time in Great Britain the beginning of the year was changed from March 25 to January 1, commencing with the year 1752. In some countries the Gregorian calendar was not adopted until the present century.

Chinese Year —The ancient Chinese lunar calendar is divided into 12 months consisting of 29 or 30 days according to duration of lunar month. The calendar is synchronized with the solar year by the addition of extra months at fixed intervals like the Indian luni-solar calendars.

The calendar [illegible] i.e. 60 years cycle. Both the New Year of Gregorian calendar (Jan. 1) [illegible] lunar calendars are [illegible] two New Year's celebration are held. The Chinese New year begins [illegible] Moon after the Sun enters Tropical *Aquarius* (*Sidereal Makara-Kumbha*). The day may fall between Jan. 21 and Feb. 19. The date is fixed according to the New Moon of the Far East. Actually the date nearly coincides with the starting of Lunar *Magha Sukladi*, in Indian lunar calendar. One such cycle of twelve animal designations are shown below for 1996 to 2007 A.D.

Rat	Ox	Tiger	Hare	Dragon	Snake	Horse	Sheep	Monkey	Rooster	Dog	Pig
1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007

This cycle of 12 years is repeated upto 60 years. So there are 5 cycles of 12 years each totalling 60 years. The animal name of the year of birth [illegible] can be known from the above chart.

FINIS

FESTIVALS AND ANNIVERSARIES IN 1999 — contd.

Moslem Festivals

Shahadat-e-Hazrat Ali	Jan. 10 Sun.	**Miladun Nabi (Prophet Mohammed's Birthday) & Fateha-Duwaz-Dahum**	**June 27 Sun.**
Jamatu'l Vida	Jan. 15 Fri.	Id-e-Maulad	July 2 Fri.
Shab-i-Qadr*	Jan. 16 Sat.	Fatiha Yaz-Dahum (Giarween Sharif)	July 25 Sun.
Idu'l-Fitr	**Jan. 20 Wed.**	Hazrat Ali's Birthday	Oct. 23 Sat.
Idu'z Zuha (Bakrid)	**Mar. 29 Mon.**	Sab-i-Miraj*	Nov. 6 Sat.
Hejira New Year Day, 1420	Apr. 18 Sun.	Sab-i-Barat*	Nov. 24 Wed.
Muharram	**Apr. 27 Tue.**	First day of Ramadan	Dec. 10 Fri.
Chehlum	June 5 Sat.		
Akhiri Chahar Samba	June 9 Wed.		
Shahadat-e-Imman Hasan	June13 Sun.		

* Observed in the preceding night. Dates are subject to the sighting of lunar crescent after Newmoon. The dates mentioned above begin at sunset on the previous evening and end at sunset on the dates as mentioned ebove.

Christian Festivals

Epiphany (Wednesday)	Jan. 6	Ascension Day-Holy Thursday	May 13
Ash Wednesday	Feb. 17	Whit Sunday -Pentecost	May 23
Palm Sunday	Mar. 28	Trinity Sunday	May 30
Good Friday	**Apr. 2**	First Sunday in Advent	Nov. 28
Easter Sunday	Apr. 4	**Christmas Day (Saturday)**	**Dec. 25**

Jewish Festivals

Purim	Mar. 2 Tue.	Day of Atonement (Yom Kippur)	Sept. 20 Mon.
First Day of Passover (Pesach)	Apr. 1 Thu.	First Day of Tabernacles (Succoth)	Sept. 25 Sat.
Feast of Weeks (Shabuot)	May 21 Fri.	Last Day of Succoth (Simhath Torah)	Oct. 3 Sun.
Tishabeab	July 22 Thu.	Hanukah	Dec. 2 Thu
Jewish New Year (5760) (Rosh Hashanah-1 Tishri)	Sept. 11 Sat.		

The above tabulated dates begin at sunset on the previous evening and end at sunset on the dates as mentioned above.

Parsi Festivals (Shahenshahi)

Jamsedji Naoroj * (Fixed)	Mar. 21 Sun.	Parsi New Year Day, 1369 (1 Farvardin)	Aug. 22 Sun.
Zarthost-no-Diso	May 29 Sat.	Khordad Sal (Birthday of the Prophet Zarthost)	Aug. 27 Fri.
Gatha Gahambar	Aug. 19 Thu.		

Jamshedi Naoroj falls on Mar. 21 every year.

National Days of India and neighbouring countries

Indian Republic Day	Jan. 26	Pakistan National Day	Mar. 23
Sri Lanka National Day	Feb. 4	Bangladesh National Day	Mar. 26
Nepal National Day	Feb. 18	Indian Independence Day	Aug. 15

Special International Days

International Woman's Day	Mar. 8	U. N. Charter Day (1945)	June 26
World Health Day	Apr. 7	World Population Day	July 11
World Book Day	Apr. 23	World Literacy Day	Sept. 8
World Enviornment Day	June 5	United Nations Day	Oct. 24
International Day against Drug Aduse and illicit trafficking	June 23	International Day for disabled persons	Dec. 3
		Human Rights Day	Dec. 10
Hirosima Day (1945)	Aug. 6	Nagasika Day (1945)	Aug. 9

Dates of Holidays of Govt. of India offices at Delhi and New Delhi are shown in bold letters.

Laser Setting at The Pagesetters : Printed at the Bose Printing House. 11A. Garpar Road. Calcutta-9.